

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

DIESEL PROGRESS



FIVE DOLLARS PER YEAR

JUNE, 1953

FIFTY CENTS PER COPY

**LONGER
RING AND
BEARING
LIFE...**

**El Paso Natural
Gas Company
reports
satisfactory
results with
TEXACO
URSA OIL P**



TEXACO

THE gas engines illustrated are part of the engine installation at the El Paso (Texas) Station of the El Paso Natural Gas Company. They went into service in 1947 and have been lubricated exclusively with *Texaco Ursa Oil*. P. Rings, bearings and cylinder liners are in A-1 condition. Parts life has been notably long.

The case is typical. Operators everywhere have proved that, regardless of type of fuel used, *Texaco Ursa Oils* assure superior performance — freedom from carbon and sludge formations, less

wear, reduced fuel consumption and lower maintenance costs.

There is a complete line of *Texaco Ursa Oils*. So whatever the type of fuel used, or operating conditions, you can count on these same benefits. Let a Texaco Lubrication Engineer tell you more about it. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



URSA OILS

**FOR ALL DIESEL, GAS
AND DUAL-FUEL ENGINES**

Gulpin' up the Gravel



PAYTON'S PLEASED with how economical UD-16s are to run. "In producing 350 cubic yards of gravel in a ten hour day, our UD-16 uses only 25 gallons of diesel fuel, and not enough oil to mention," says veteran operator John Payton.

International performance means production at a profit for Nebraska operator

Milan Gayman Sand and Gravel Company, North Platte, Nebraska carries out its highway gravel contracts with ease.

With International UD-16 diesel engines for power, the pumps suck up approximately 350 cubic yards of gravel a day from the Calamus River bottom.

Operator John Payton is sold on International power:

"Our UD-16 sure's a good engine for pump operations. My boss has two of them, and they sure are producers. Easy to start, pack plenty of power, are economical—and best of all—they never give me downtime trouble. I don't think Internationals can be beat by any engine made!"

This kind of satisfaction is common among International engine operators and owners, all across the country. Find out what your International Distributor or Power Unit Dealer can do for you with profitable International "Power that Pays."

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.



HALFWAY 'CROSS THE CALAMUS. On a typical job like this, International's UD-16 engine powers the pump sucking a cubic yard of gravel every 1¼ minutes from a 25-foot depth, pushing it 100 feet to the bank, with a 30-foot lift to the screen.

INTERNATIONAL
POWER THAT PAYS





A NEW NAME FOR A famous Supercharger

MIEHLE-DEXTER supercharger boosts power, decreases weight-to-horsepower ratio on leading Diesels.

Extra Power to Pull Heavy Loads! Power that means less engine space, less weight per horsepower and more *usable* horsepower. That's supercharging with performance-proved M-D supercharger.

Lab tested for efficiency at Borg-Warner's supercharger laboratory, it's the same supercharger proved for staying power, efficiency and low maintenance service on leading Diesels.

Exclusive Features Improve Performance. The M-D supercharger's exclusive end plate design and tip insert reduce rotor end clearance and improve engine fuel economy. Lightweight 3-lobe rotor cuts vibration and allows high speed safely... to improve efficiency.

Specify standard M-D models for your applications from 100 to 750 h.p. Or for special requirements consult your M-D engineer.

For more facts write Miehle-Dexter Supercharger Division, Racine, Wisconsin.



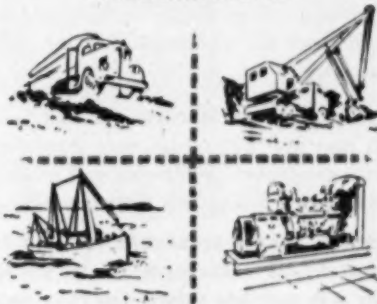
MIEHLE-DEXTER SUPERCHARGER DIVISION

100 FOURTH STREET • RACINE, WISCONSIN

FIELD TESTED ON LEADING DIESELS

The M-D supercharger has won universal acceptance on engines produced by many of the leading Diesel Engine manufacturers, including the following:

Venn Severin Hercules
Buda Cummins Murphy
Fairbanks-Morse



The M-D positive displacement supercharger is now engineered and produced by the Miehle-Dexter Supercharger Division of the Dexter Folder Company. The Division maintains complete servicing and repairs for new superchargers and for the thousands now in operation.

**new
safety
new
convenience
in
Generator
Switchgear**



New E-M Swing-Door Instrument Panel

● Take a good look at this new Swing-Door Instrument Panel on E-M Generator Switchgear . . . switchgear with a panel mounted on hinges, opening as a door to expose rear of panel and switchgear interior. Briefly, here are its advantages:

1. SAFER, FASTER TESTING: You can test with greater safety than ever before! No more stretching across busses to reach components. Instruments and protective relays are mounted on the Swing-Door for accessibility.

2. SAFER, FASTER REPLACEMENTS AND CHANGES: New location of fuses makes it possible for you to replace them quickly with complete safety. You have easy access to all parts . . . control circuit connections, selector switches, relays, and others.

3. CLEANER, NEATER ARRANGEMENT: Notice how the back side of the Swing-Door is utilized to fullest advantage for mounting and connections. A special mounting panel on the inside can carry fuses, voltage regulators, transformers, relays, resistors, etc. This extra space makes it possible to spot every component in the most accessible location.

In addition, the new E-M Switchgear shown above features handy draw-out air breakers which may be racked for quick disconnect or complete removal. Large 6-inch instruments are spotted high on the panels for

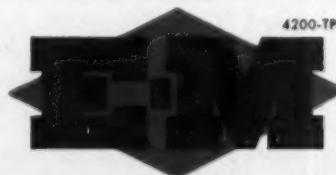
easy reading. And you'll find that E-M Switchgear frames are permanently rigid . . . gusset-plate construction is used throughout.

This new Swing-Door Panel is typical of E-M's "extra value" Switchgear engineering. Each job is engineered and designed individually to meet your most exacting specifications. All E-M Switchgear is completely assembled and tested at the factory . . . it's ready to install.

Ask your nearest E-M sales engineer to give you full information on E-M Switchgear with the new Swing-Door Instrument Panel.

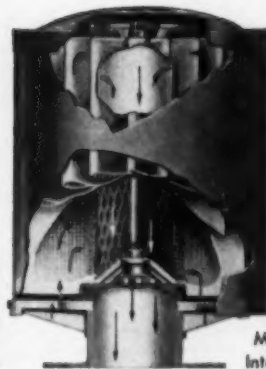
ELECTRIC MACHINERY MFG. CO.
MINNEAPOLIS 13, MINNESOTA

4200-TPA-2130



Specialists in
**MODERN
SWITCHGEAR DESIGN**

BEST ENGINE PROTECTION MONEY CAN BUY!



MODEL D
Intake Filter

STAYNEW
INTAKE FILTERS

STAYNEW INTAKE FILTERS keep shutdowns and repairs at an absolute minimum. Industrial engineers everywhere know that Staynew's *positive protection* lengthens engine life. They may cost more than ordinary intake filters, but with Staynew, you're assured of engines operating at top performance years longer. Staynew Intake Filters' extreme efficiency protects vital engine parts without carefully held maintenance schedules. And, efficiency actually increases with use. They're efficient over a wide range of loads, not affected by temperature changes, there's no oil carry over and no oil blow-out on free air unloading compressors. To keep equipment young *longer*, always specify Staynew.

Write today for Intake Filter Bulletin S.I.F.

Representatives in Principal Cities



DOLLINGER

CORPORATION

12 Centre Park Rochester 3, N. Y.

ALL TYPES OF FILTERS
FOR EVERY INDUSTRIAL NEED



The **CALTEX PAKANBARU**, Caltex Pacific Petroleum Maatschappij river tanker, designed by the marine technical staff of Caltex. Built at the John Cockerill Shipyard in Belgium, the 260-ft. shallow-draft tanker has a loaded displacement of 4,185 tons and is powered by 2 Model 8-278-A General Motors Diesel Engines.

SMOOTH POWER FOR A CRUDE CARGO

It's about 12,000 miles from Cleveland to the Siak River in Sumatra. When engines are that far from home, dependability is a must. And when you're running 80 miles to the sea with 23,000 barrels of crude oil over a narrow, winding river like the Siak, you need smooth running engines that respond instantly to pilothouse commands.

Dependability and maneuverability are two big reasons why CALTEX PAKANBARU uses General Motors Diesels, built by Cleveland Diesel Engine Division, for main propulsion power. They're the same reasons why the Navy, Coast Guard and a long list of leading commercial operators throughout the country and all over the world also rely on these engines.

CLEVELAND DIESEL ENGINE DIVISION

GENERAL MOTORS • CLEVELAND 11, OHIO



TIE UP TO GM SERVICE



ENGINES FROM 150 TO 2000 H. P.

Sales and Service Offices: Cambridge, Mass. • Chicago, Ill. • Jacksonville, Fla. • Miami, Fla. • Montreal, P. Q. • New Orleans, La. • New York, N. Y. • Norfolk, Va. • Orange, Texas • San Diego, Calif. • San Francisco, Calif. • Seattle, Wash. • St. Louis, Mo. • Tampa, Fla. • Toronto, Ont. • Vancouver, B. C. • Washington, D. C. • Wilmington, Calif.



Typical installation of
American Hammered
Conformable Oil Rings

AMERICAN HAMMERED CONFORMABLE OIL RING

Insures constant unit pressure

for positive oil control! You keep your oil consumption down when you install Koppers American Hammered Conformable Oil Rings! This service-tested piston ring conforms readily to meet cylinder distortion because its flexible cast iron member is pressed outward by an abutment type spring which exerts uniform radial pressure around the entire circumference.

Narrow bearing surfaces on either side of the channel give the ring a uniform unit pressure on the cylinder, enabling it to seat promptly and assuring maximum removal of excess oil

throughout its lifetime. And the Conformable Oil Ring has a longer useful life because its low spring rate and uniform lands result in negligible changes in pressure as the ring wears.

Easily installed, it is ideal for both 2-cycle and 4-cycle Diesel & Gas engines; comes in 4" to 25" diameters with a minimum width of $\frac{1}{4}$ ". Write, wire or phone us today for full information on how the Conformable Oil Ring can improve your operation . . . or for expert help in any piston or sealing ring problem. KOPPERS COMPANY, INC., *Piston Ring Dept.*, 1586 Hamburg Street, Baltimore 3, Maryland.



METAL PRODUCTS DIVISION • KOPPERS
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This Koppers Division also supplies industry with
Fast's Couplings, Aeromaster Fans, Koppers-Elex
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Gentlemen: Please send me full information on your Conformable Oil Ring.

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Company.....
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City..... Zone..... State.....

HUNT-SPILLER

GUN IRON



FOR YOUR ^{off} STANDARD REPLACEMENT PARTS

The use of standard replacement parts is not necessarily the most economical way to rebuild old equipment. That's why Hunt-Spiller can and does supply parts which are dimensionally suited to particular job requirements.

As a case in point, many cylinder liners are now being furnished with custom fits for the older Alco and Baldwin diesel engines. By Hunt-Spiller's machining of the O.D. of the liner to oversize dimensions, reboring of the engine frame itself is all that is necessary to be assured of an accurate, leak-proof fit. Structural changes required to secure proper fits with liners of standard dimensions are eliminated. Replacement costs are held to a minimum, particularly since Hunt-Spiller parts of this type are supplied at standard prices.

In addition to the advantage of being able to secure parts machined to your specifications, you get those parts made of Gun Iron . . . the dense, close-grained iron ideally suited for resistance to frictional wear, heat, pressure, corrosion and erosion.

In standard or off-standard replacement parts, you'll always get more for your money from Hunt-Spiller.

A NEW CATALOG

HAVE YOU RECEIVED your catalog of Hunt-Spiller Diesel Parts? If not, a copy is yours for the asking. Write for it today.



HUNT • SPILLER

MANUFACTURING CORPORATION

387 DORCHESTER AVENUE • SOUTH BOSTON 27, MASS.

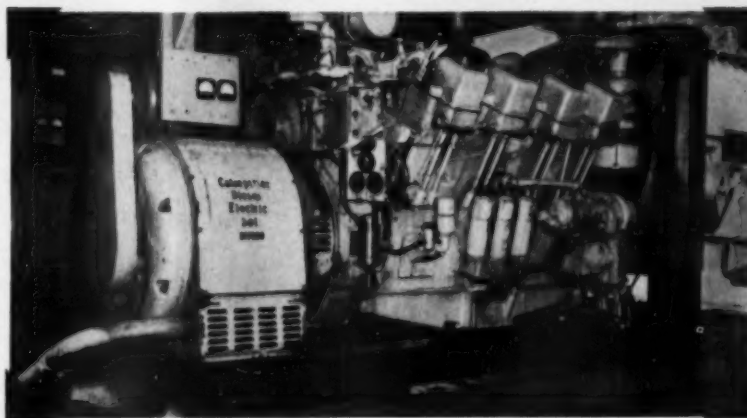
Canadian Representatives: Joseph Robb & Co., Ltd., 4050 Namur St., Montreal 16, P. Q.

THE ENGINEER'S REPORT

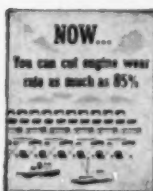
LUBRICANT	DATA RPM DeLo Supercharged-2
UNIT	D17000 diesel engine
OPERATION	Constant operation in extreme temperatures
PERIOD	9277 hours
FIRM	Diamond Lumber Co., Glenwood, Oregon

Diesel engine "spotless" after 9,277 hours of work!

THIS D17000 DIESEL ENGINE worked 17 hours per day in weather that varies from below zero to over 100 degrees. Lubricated with RPM DELO Supercharged-2 Lubricating Oil since installation, it was inspected after 9,277 hours of operation. The engine looked as though it had just been thoroughly cleaned—"spotless" according to the engineer on the job. This is one of six D17000 Cats which was used to supply power for Diamond Lumber Company's mill at Lee's Camp, Oregon. This mill cuts approximately 100,000 board feet of Douglas fir per day.



REPRESENTATIVE PISTONS, exactly as they came from engine after 9,277 hours, show cleanliness of all parts. Wear at top of cylinder liners miked only 0.0015 inch! Con rod and main bearings were all good, valves and valve seats were in excellent condition. The RPM DELO Lubricating Oil in this engine was changed at regular intervals.



There is an RPM DELO Oil to meet every heavy-duty engine operating condition.

FREE BOOKLET on the RPM DELO Oils gives you complete information. Write or ask for it today.



How RPM DELO Oils keep engines clean and prevent wear



- A. Contain special additives that provide metal-adhesion qualities...keep oil on parts whether they are hot or cold, running or idle.
- B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean, helps prevent scuffing.
- C. Special compounds stop corrosion of any bearing metal, and oil foaming in both wet and dry sump engines.

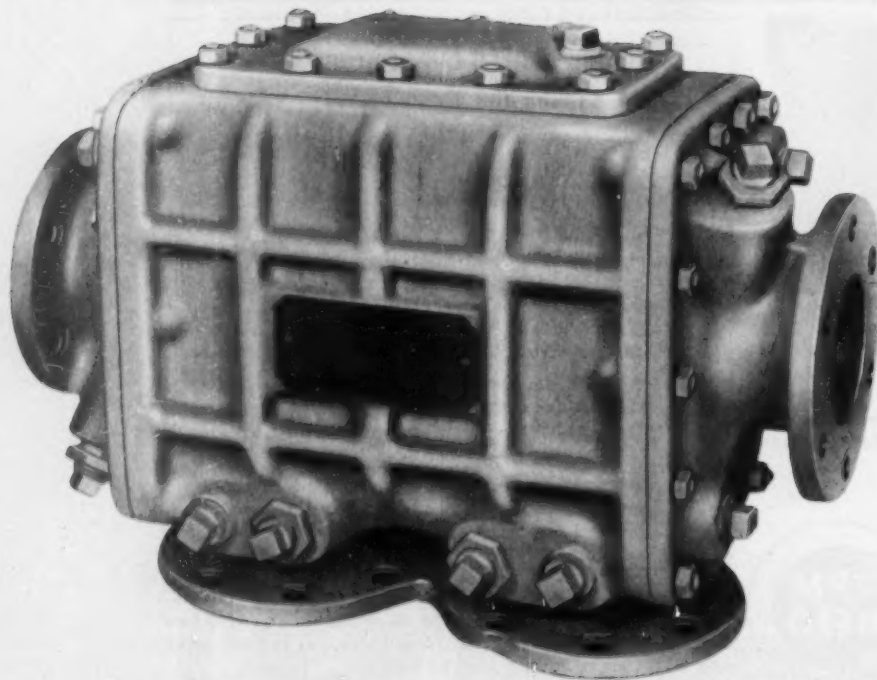
FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

Harrison Heat Exchangers

for dependable duty on Diesels



The cooling of lube oil and the cooling of jacket water in Diesel engines is accomplished dependably and economically by Harrison heat exchangers.

This is because *Harrison knows what it is doing . . .* Harrison has been producing heat transfer products that combine high capacity with compactness and durability for forty-two years.

Our engineering experience and our unsurpassed facilities for manufacturing and testing all types of heat exchangers are invaluable to Diesel manufacturers in helping develop units with which to meet their requirements.

HARRISON
RADIATOR DIVISION
GENERAL MOTORS CORPORATION
LOCKPORT NEW YORK

HARRISON

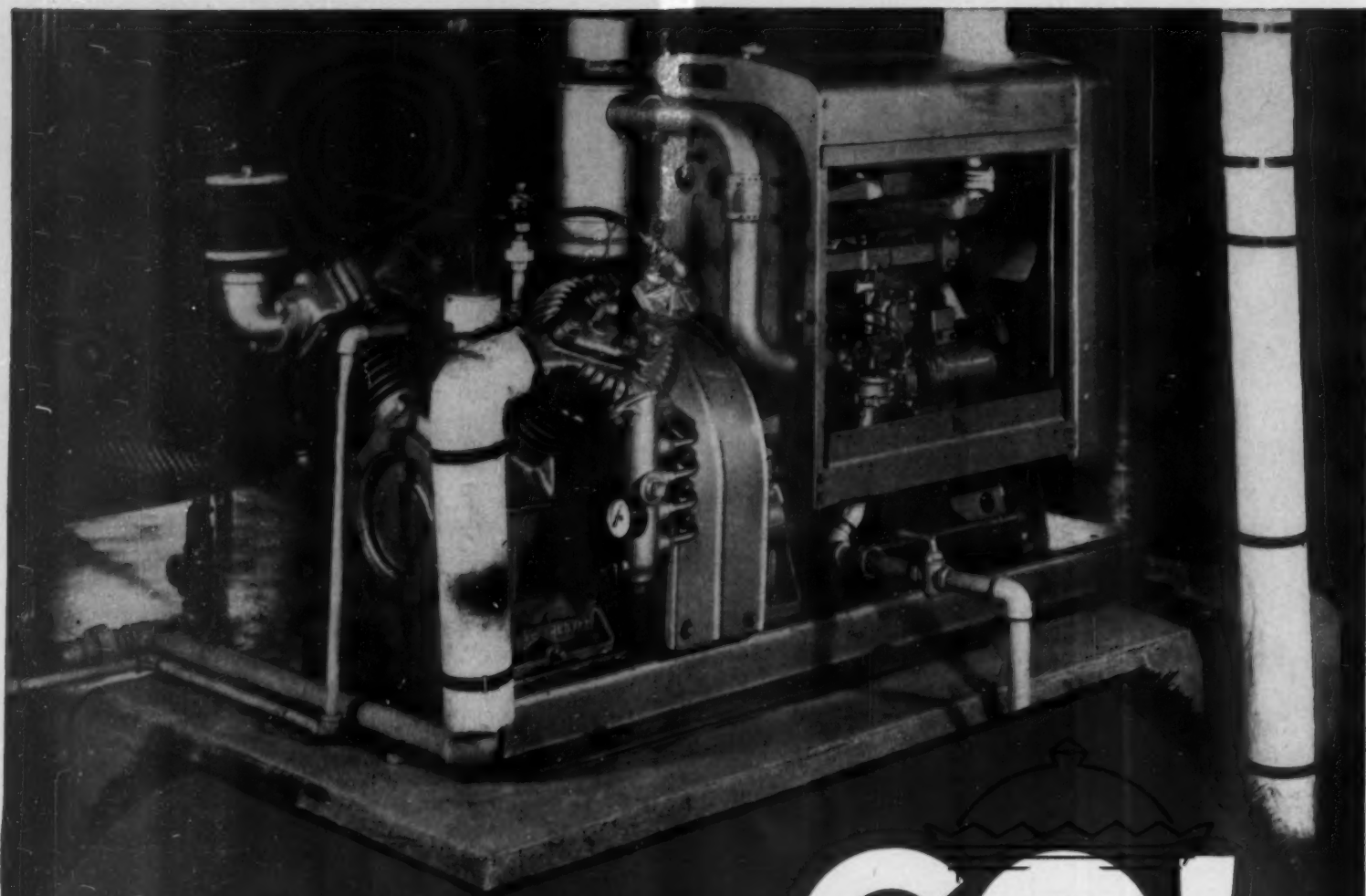


Model AC-2 Air Cooled 13 H. P. Diesel Engine

HALLETT MANUFACTURING COMPANY

1601 WEST FLORENCE AVENUE • INGLEWOOD, CALIFORNIA

World's Finest Low Horsepower Diesel Engines



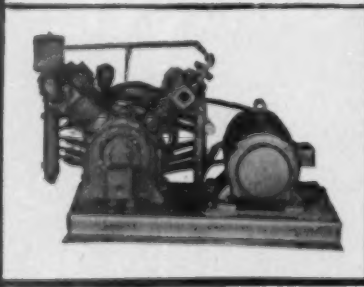
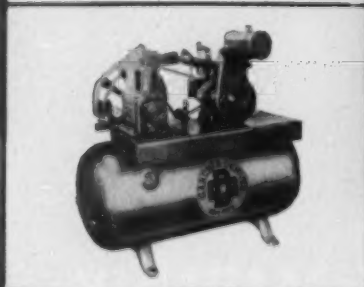
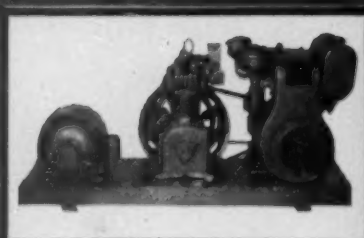
GET SET TO GO!

**-any time
-every time!**

... with "sure-fire" starting air
from one of these Gardner-Denver
Engine Starting Air Compressors.

You'll find a model to meet the
capacity and pressure requirements
of your diesel plant—regardless of size.

write today for bulletin ES-2.

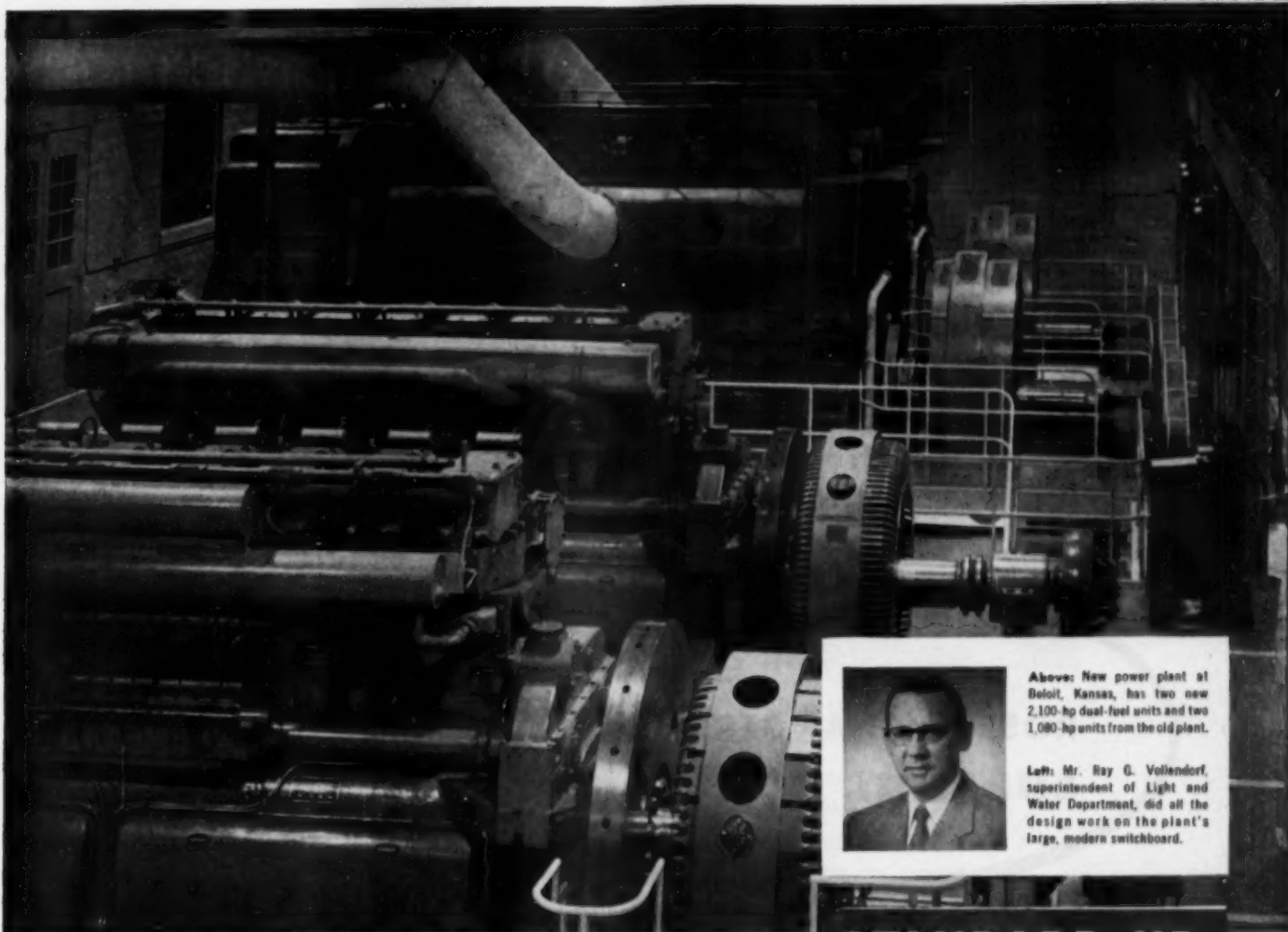


SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY



Above: New power plant at Beloit, Kansas, has two new 2,100-hp dual-fuel units and two 1,080-hp units from the old plant.

Left: Mr. Ray G. Vollendorf, superintendent of Light and Water Department, did all the design work on the plant's large, modern switchboard.

New Beloit, Kansas, plant gets record low maintenance with...

STANDARD HD
TRADE MARK
OIL

● Acclaimed as one of the municipal showplaces of the Midwest, the new power plant at Beloit, Kansas, is going itself one better in actual performance.

The decision of Mr. Ray Vollendorf, plant superintendent, and city officials to switch to dual-fuel operation has paid dividends. Dual-fuel operation of the two new 2,100-hp units and a 1,080-hp converted unit has reduced fuel cost per kilowatt hour by more than 50%.

Another decision has brought its reward. To STANDARD HD Oil went the job of lubricating the plant's four diesels. Now, after nearly two years' operation, Mr. Vollendorf reports that crankcases are as clean as the day the diesels were placed in service. No rings or bearings have needed to be replaced. Visibility of tool marks on the rings and the over-all excellent condition of the engines indicate that

many more hours of service are possible before any overhaul or replacement of parts will be required.

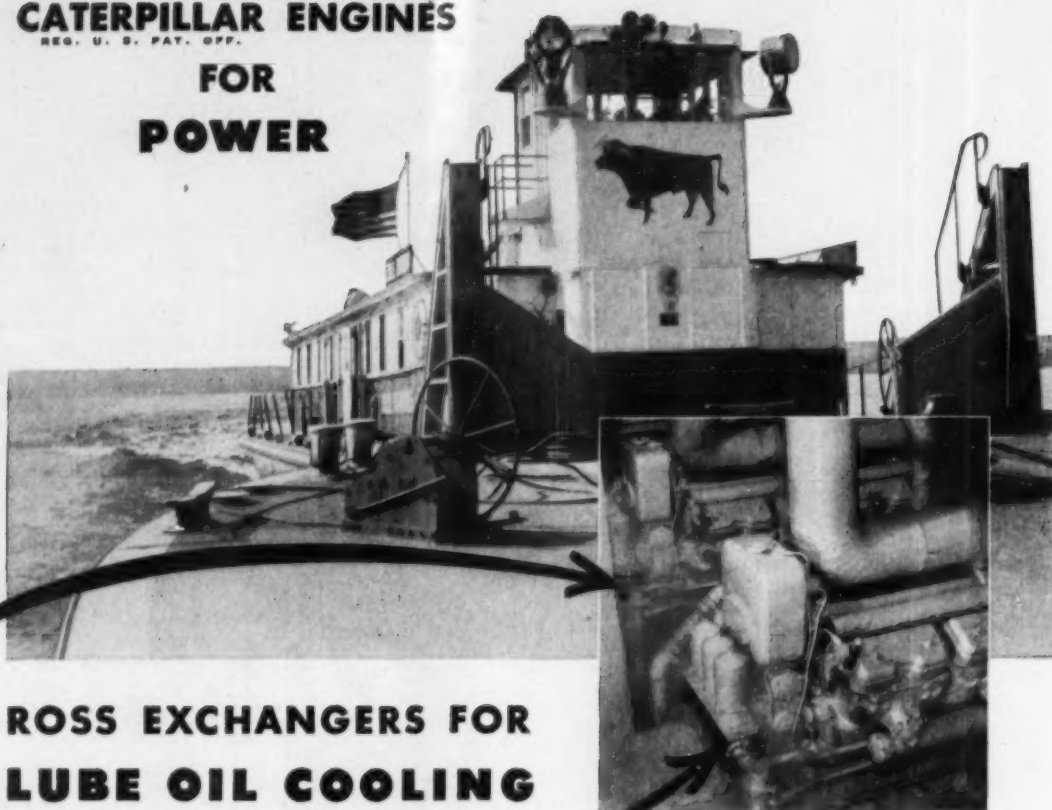
Including the two years' operation of the new plant, the experience of Beloit, Kansas, municipal officials with Standard Oil products covers 20 years. That experience testifies to the satisfaction and benefits you'll realize through Standard Oil's high quality products and outstanding service. You can reach the Standard lubrication specialist in your area of the Midwest by phoning your local Standard Oil office. Or, write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois.

STANDARD OIL COMPANY



(Indiana)

CATERPILLAR ENGINES
REG. U. S. PAT. OFF.
FOR
POWER



ROSS EXCHANGERS FOR
LUBE OIL COOLING

Two of the "Bull Durham's" 5 Caterpillar Engine. All are equipped with Ross Exchangers for lube oil cooling.

... in the hard working M/V Bull Durham

Along the Mississippi from Chicago to St. Louis — Bull Towing Company's M/V Bull Durham has made a name for itself. Operating 24 hours a day, 12 months out of the year, this mighty tow boat depends upon 3 Caterpillar Marine Engines for propulsion power and 2 Caterpillar Diesel Electric Sets for auxiliary power.

Among the key components of all of them are rugged, dependable Ross Type BCF Exchangers. For, to enable work boats like the "Bull Durham" to carry out "work horse" schedules, engine lube oil temperatures must be kept under control... *and they are!*

Assignments such as these, have gained widespread acceptance for Ross Exchangers in numerous other marine applications: boiler feed pumps, turbines, compressors, blowers, reduction gears, hydraulic clutches... as oil and water coolers, as heaters.

Proven dependability, pre-engineering and standardization make them economically

advantageous to equipment builder, boat builder, and boat operator alike.

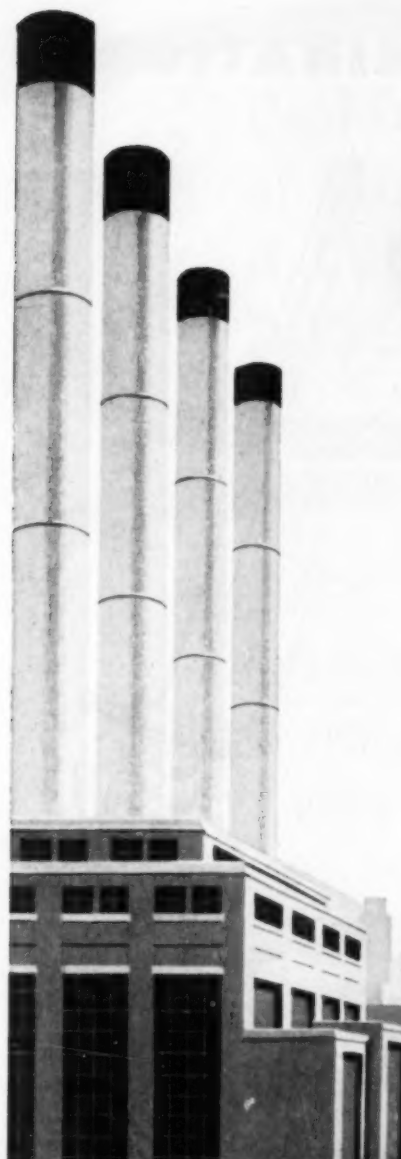
For information on both commercial and naval applications, request literature.

KEWANEE-ROSS CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1425 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.



Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS

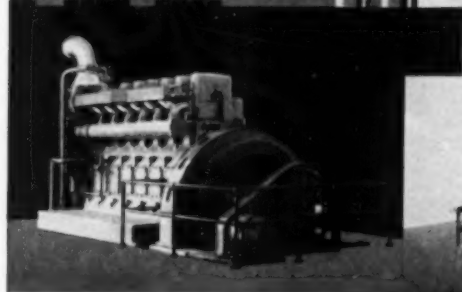


helping to generate a **power-full** "Municipal Story"

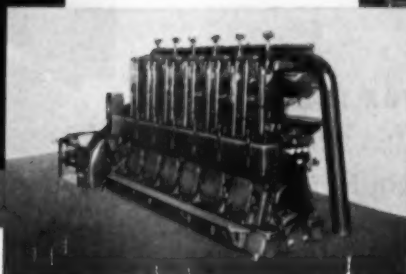
All over America powerful diesel engines are meeting the dual challenge of increasing load capacities and lowering the cost of power production for municipalities.

It is only natural that each year sees an increasing number of diesels in municipal use, for the economy of diesel operation has proved to be an important contribution toward reduced taxation and balanced city budgets.

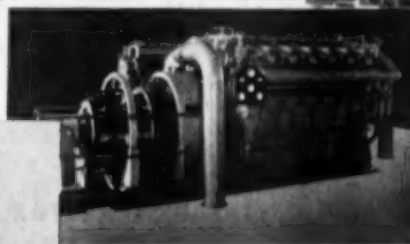
It is also significant that more and more cost-conscious municipal operators are installing diesel power plants with Bendix Fuel Injection because Bendix is long experienced in working with diesel manufacturers in achieving maximum performance with low operating costs.



Nordberg 800 H.P. 6-Cylinder Diesel



Baldwin 750 H.P. 6-Cylinder Diesel



Cooper-Bessemer 1500 H.P. 12-Cylinder Diesel



Bendix
FUEL INJECTION
EQUIPMENT

SCINTILLA MAGNETO DIVISION of *Bendix*
SIDNEY, NEW YORK

AVIATION CORPORATION

Western Market Office: 582 Market Street, San Francisco, Calif.

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, N. Y.

WHEN FIGHTING CONTAMINATION..

**HOW MANY EDGES
HAS YOUR SWORD?**

The De Laval "Puri-Filter" is a two-edged weapon against lubrication troubles. The first blade is the De Laval Centrifugal Oil Purifier which removes harmful carbon and water. The second blade is the Fram "Filcron" Filter, which begins where the centrifuge leaves off, removing colloids of carbon and leaving the oil *visibly* clean.


The "Puri-Filter" is a flexible unit. The size of the centrifuge required can be varied with the reservoir capacity of the engine, and the number of filter cartridges likewise may be adjusted to work best with a particular size centrifuge and oil.

The centrifuge-plus-filter combination gets rid of all *three* contaminants in the oil . . . water, oil and carbon. Thus the protection to the bearings is an absolute maximum.

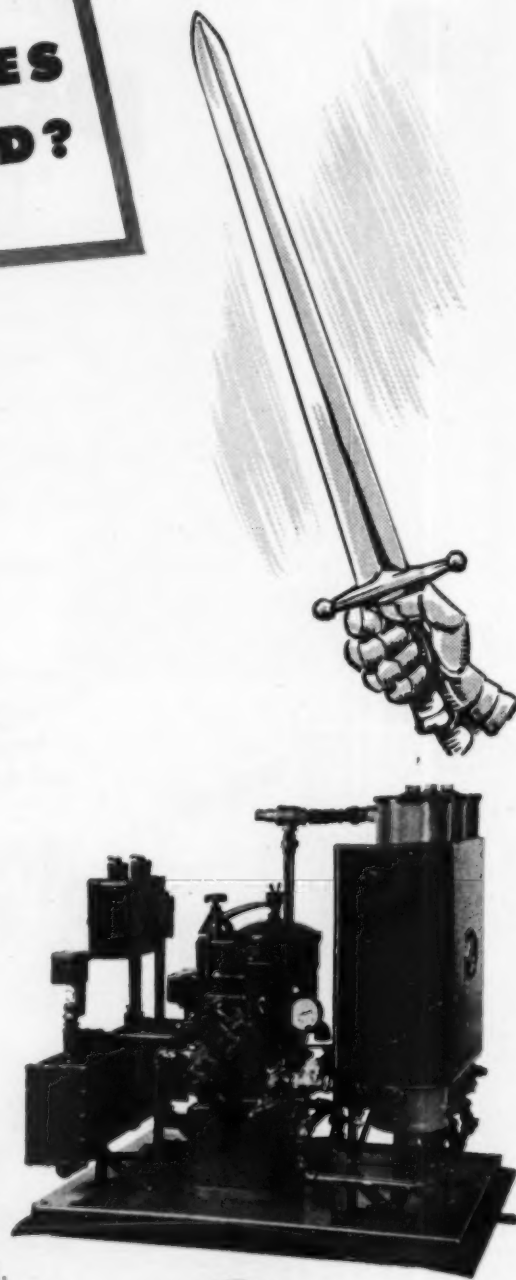
THE DE LAVAL SEPARATOR COMPANY
Chicago POUGHKEEPSIE, N.Y. San Francisco

● Write for Bulletin DL-1.

De Laval


**for most dependable
power production**

LUBRICATING OIL PURIFIERS

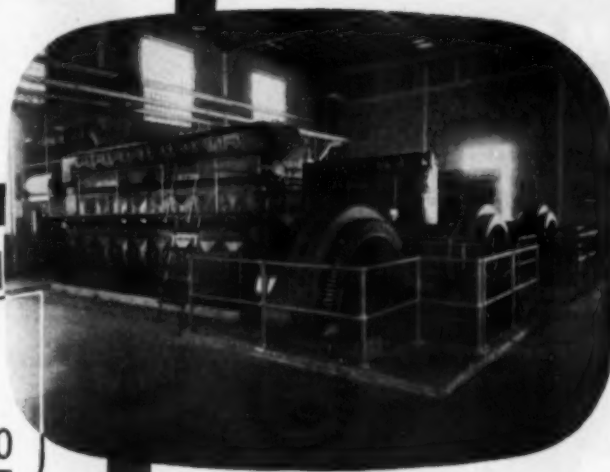




Dual-Fuel Operation of **SUPERIOR** 4-CYCLE DIESELS

helps

• Bellefontaine, Ohio
maintain efficiency
in two utility plants



Engine-room view of the new electric plant shows the three Superior Diesels direct-connected to 1000 KW generators.

Continued population growth and industrial power demands on its municipal plant led officials of the City of Bellefontaine, Ohio, to expand generating capacity, using diesels as prime movers.

But the community had another utility—a gas plant—which had to be operated year-round to maintain a satisfactory income for the municipality. And that's where Superior Dual-Fuel Diesels fitted into the city's plans—diesels which could be operated on gas during the summer, and on oil during the winter months when the gas plant's entire production was needed for other purposes.

The advantages of dual-fuel operation of Superior 4-cycle Diesels were well-known to the administrators

of Bellefontaine because there are so many of these engines operating throughout Ohio, and everywhere else in the U.S.A. It's understandable, then, that the first nine months of operation have convinced Chief Utilities Engineer, F. M. Baxley, that Superiors were the logical choice on the basis of performance and fuel economy.

Here, then, is a typical municipality using three Superior Diesels for power generation and getting the same satisfactory results as hundreds of other cities and towns using Superiors. If you haven't checked up lately on the way Superior Diesels fit into municipal utility plants of all types, call your Superior-Atlas Representative or write Springfield for facts and figures.



Distributor of *Lister* Diesels in the U. S. A.

ENGINE DIVISION

THE NATIONAL SUPPLY COMPANY

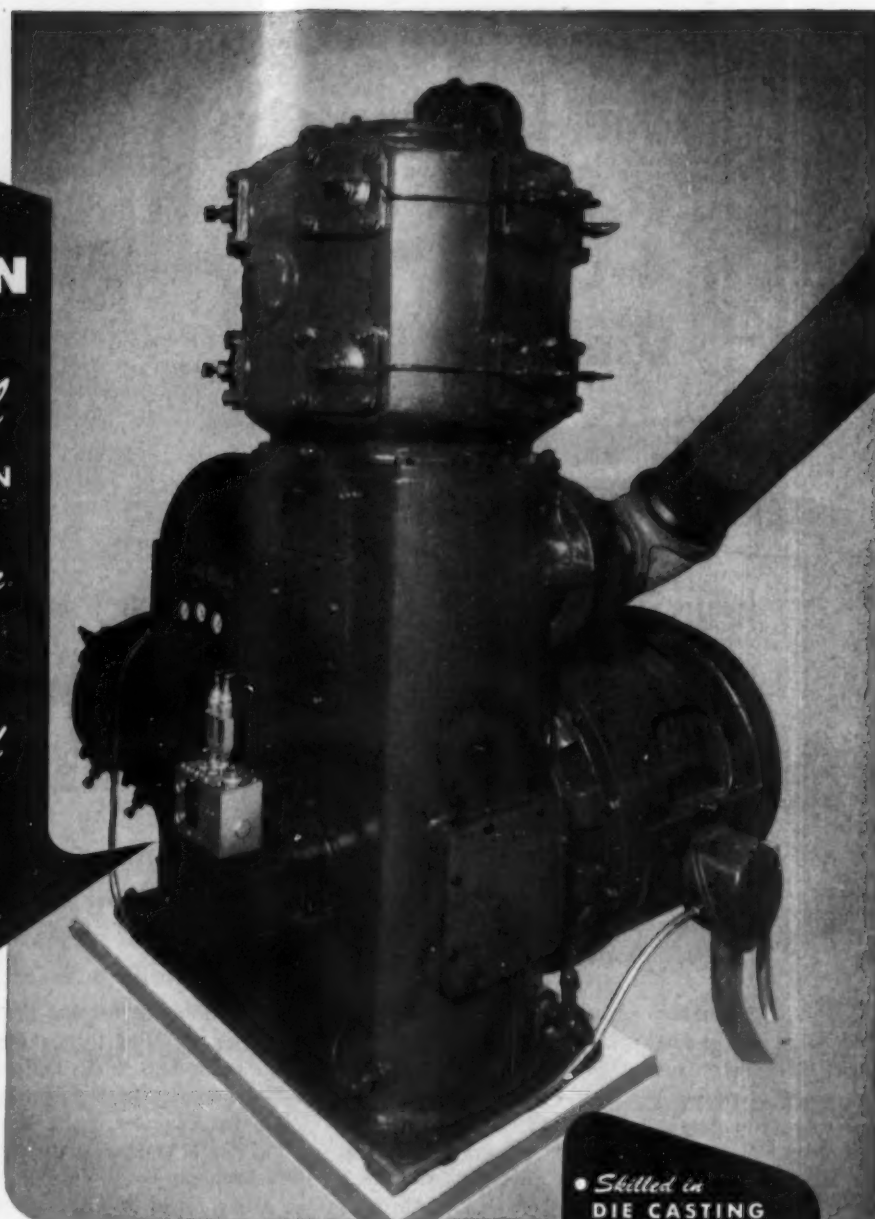
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Park Rapids, Minnesota
New York • Seattle • New Orleans

**MADISON
-KIPP**
fresh oil
LUBRICATION

*fed under
pressure
by the
measured
drop!*

*Illustrated, the
Madison-Kipp Model
SVH Lubricator
on an Ingersoll-Rand
XLE Compressor.*



**.... STANDARD EQUIPMENT ON COMPRESSORS,
WORK ENGINES AND MACHINE TOOLS....**

Oil under pressure fed drop by drop from a Madison-Kipp Lubricator will definitely increase the production potential for years to come when applied as original equipment on new machine tools, work engines and compressors. There are six popular models for every application. Write for special engineering data for your particular requirement.

- *Skilled in
DIE CASTING
Mechanics*
- *Originators of
Really High Speed
AIR TOOLS*
- *Experienced in
LUBRICATION
Engineering*

MADISON-KIPP CORPORATION

215 WAUBESA STREET, MADISON 10, WIS., U.S.A.

ANCIENS ATELIERS GASQUY, 31 Rue du Marais, Brussels, Belgium, sole agents for Belgium, Holland, France, and Switzerland.

WM. COULTHARD & CO. Ltd., Carlisle, England, sole agents for England, most European countries, India, Australia, and New Zealand.



Fewer Shifts for Faster Trips

Take a ride in any mechanical-drive off-highway truck. Watch the driver work all the way as he double-clutches, slows down, shifts and speeds up over and over again. He'll be using up to ten transmission speeds to make his run and it'll be tough going all the way.

Now take that same trip in a truck that has an Allison TORQMATIC DRIVE. The driver's left foot will be idle because there's no clutch pedal to push. Notice how he just flicks a lever to shift *without slowing down*. And notice that with the flexibility

of the torque converter he needs only three forward speeds to adequately handle all loads and grades. He'll be making fewer shifts and be back for another load a lot faster. Faster trips mean more pay loads per day.

Matched units built by one manufacturer, Allison TORQMATIC DRIVES cut operating and maintenance costs by absorbing harmful shock loads. Ask your equipment manufacturer, dealer or write:

ALLISON Division of GENERAL MOTORS
Box 894DD, Indianapolis 6, Indiana

ALLISON TORQMATIC DRIVES

*Unbeatable Team for Maximum
Operating Economy*

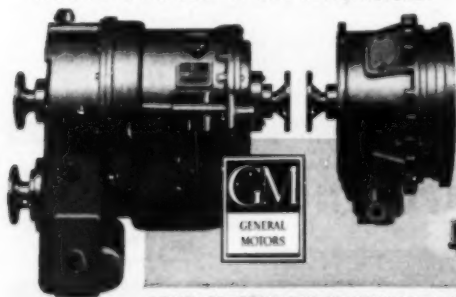
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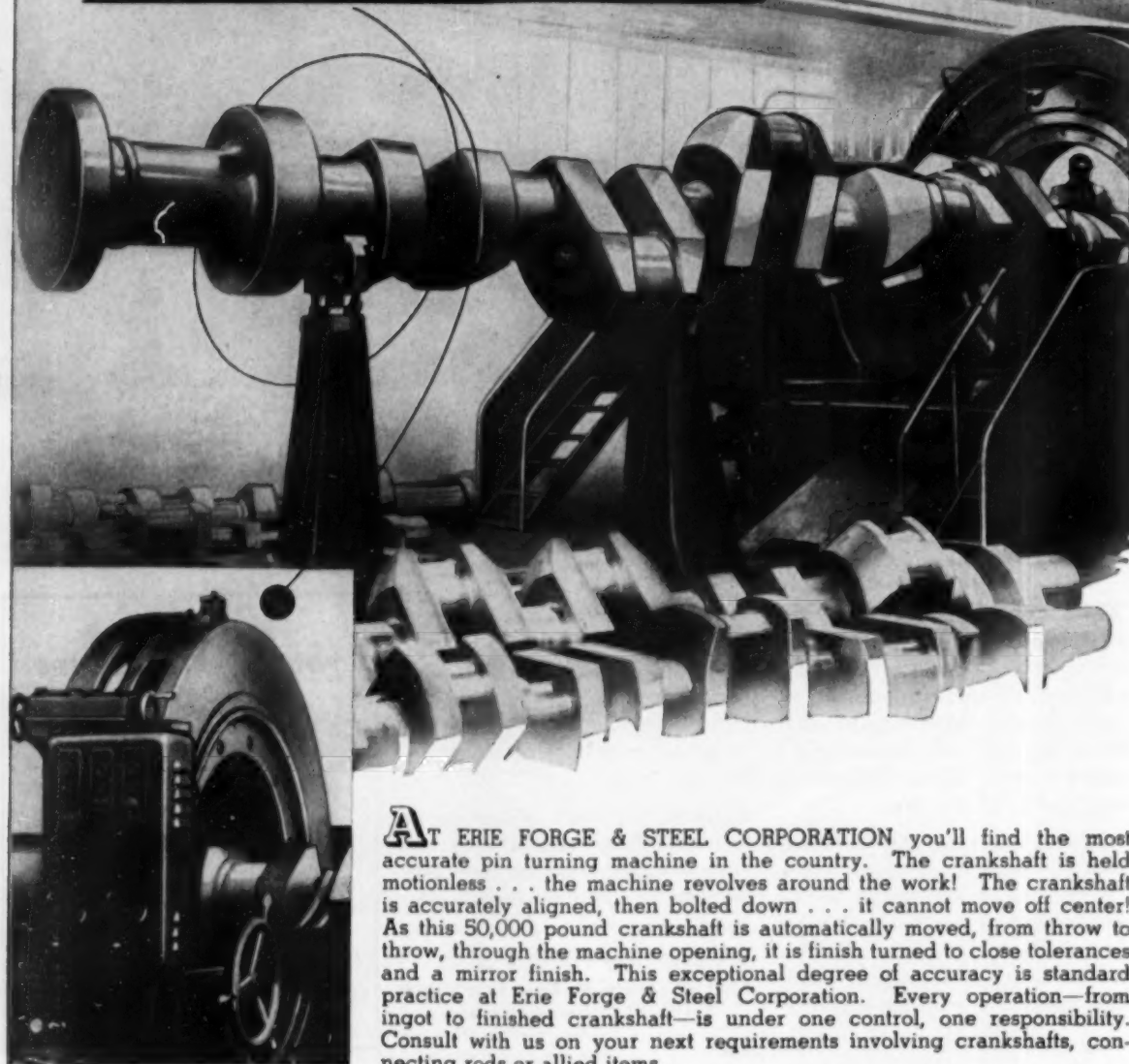
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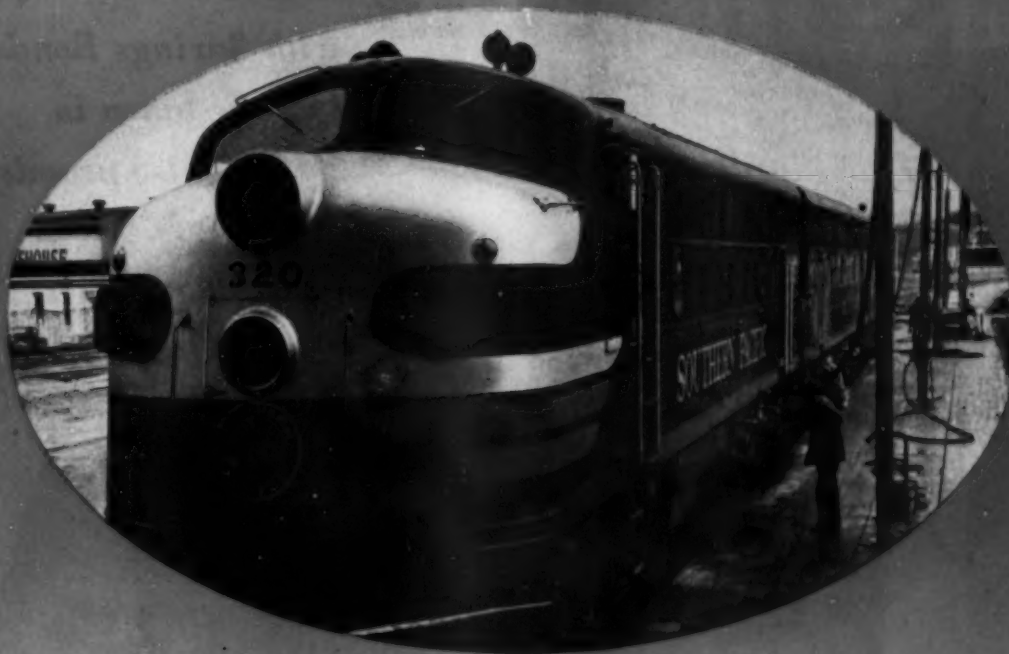
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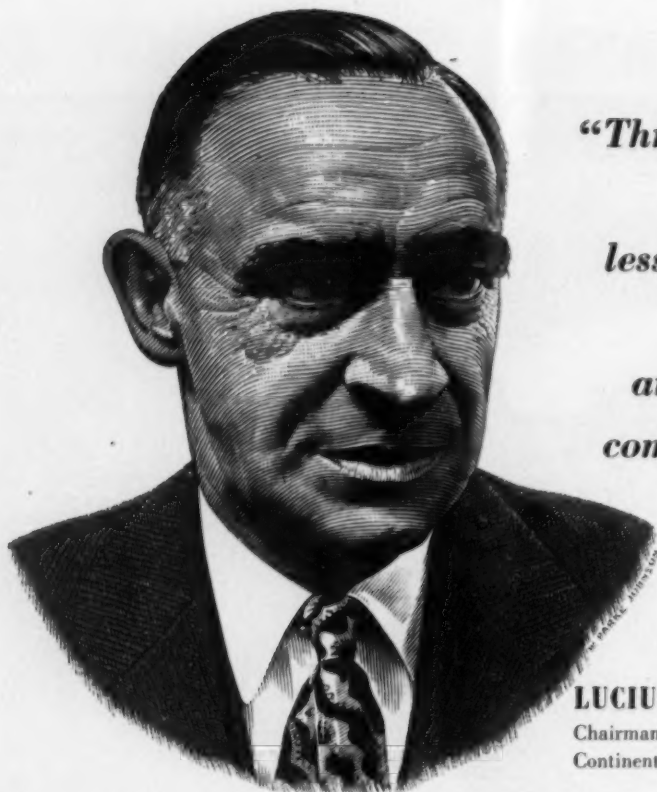
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Editor—DIESEL PROGRESS



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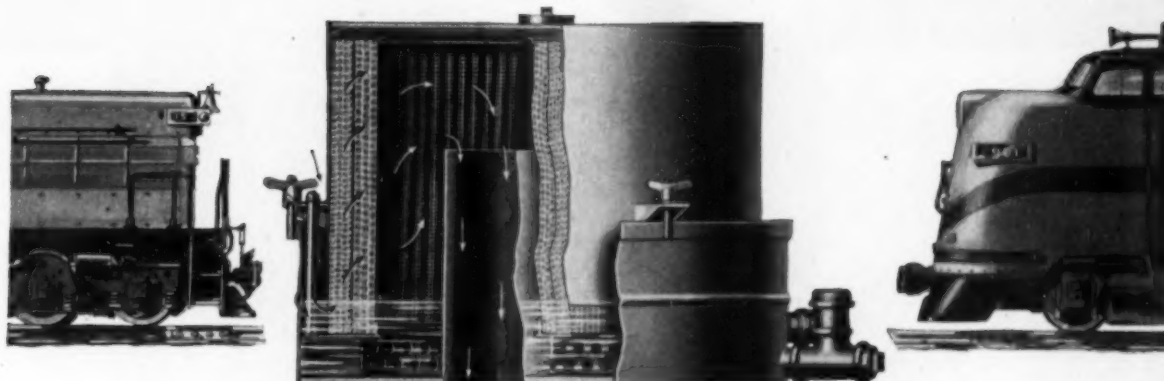
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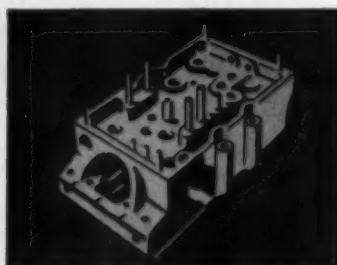
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FRONT COVER
ILLUSTRATION

The Joe. Chotia, recently launched as an auxiliary tug, is shown in the foreground. The tug is powered by a 1000-hp diesel engine. The tug is shown in the foreground, with the ship's name 'JOE CHOTIA' visible on its side.

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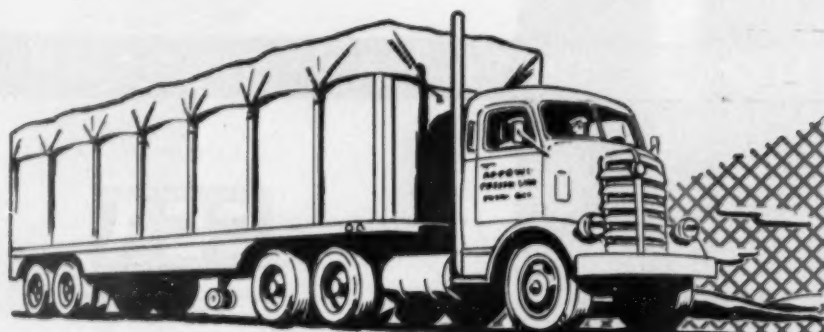
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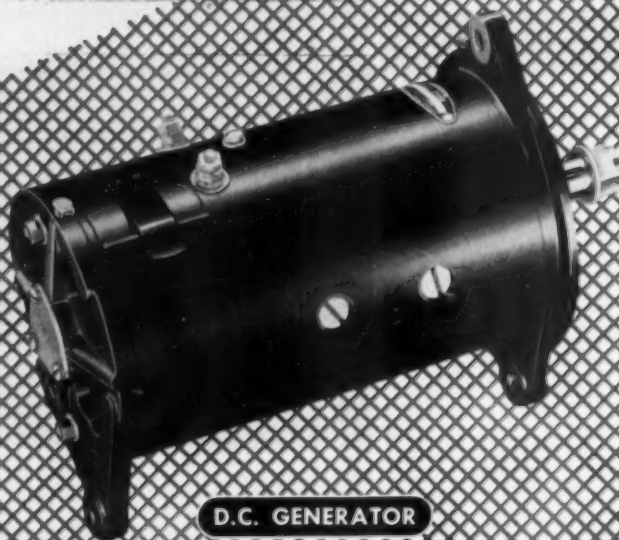


DELCO-REMY HEAVY-DUTY 5 $\frac{5}{8}$ " DIAMETER GENERATORS AND MATCHING REGULATORS

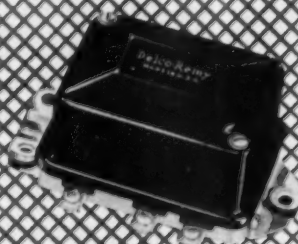
Delco-Remy heavy-duty 5 $\frac{5}{8}$ " diameter generators have made a name for themselves with Diesel users who need units that develop full output at low speeds on governed Diesel engines. These Delco-Remy generators have exceptionally long brush life (100,000 miles or more is common) and, because of durable construction and simple, dependable lubrication system, require minimum maintenance.

Heavy-duty features include an extra-heavy, rigid armature shaft, extra-large brushes and commutator, ball bearings in both commutator and drive end frames, wick-type lubrication with oilers, and forced ventilation of the entire unit.

These generators, with a frame diameter of 5 $\frac{5}{8}$ inches, are available in 6-, 12-, 24- and 32-volt models. Six-volt models have capacities as high as 55 amperes, 12-volt models as high as 50 amperes. The 24- and 32-volt models provide outputs of 20 and 15 amperes, respectively. Matching regulators are available for all models. Specify Delco-Remy heavy-duty generators with mounting brackets and pulleys when ordering new vehicles.



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WHEREVER WHEELS TURN OR PROPELLERS SPIN

A NEW VIEWPOINT

The International Turbine Specialist Rudolph Birmann Attacked the Design of a Turbosupercharger From an Entirely New Angle—With Astounding Results

By REX W. WADMAN

TRENTON, N. J., May 10th. In my visits to the big engine shops in recent months, I have witnessed test after test of a new DeLaval turbosupercharger. These tests having progressively gotten more and more interesting, I decided to go see the designer. So I hopped a plane in Los Angeles yesterday, flew down to New York and then trained down here to Trenton today.

Arriving at the DeLaval Steam Turbine shops, I was met by my old friend James P. Stewart, President of DeLaval, who promptly introduced me to Rudolph Birmann, the designer of the new DeLaval turbosupercharger—from then on I worked.

Before I go any further, I want to tell you about this man Birmann and why I thought it worthwhile to make a round trip across the country to visit with him. As you probably know, the turbosupercharger idea kind of originated in Switzerland and that's where Rudolph Birmann was born and educated. He came over here in 1922 and became steam turbine engineer with Westinghouse for a couple of years, then came here to Trenton and joined DeLaval in charge of turbine design and special assignments. Stayed here until 1939 then formed his own company, the Turbo Engineering Company, engaged in the development and production of geared and exhaust-gas-driven aircraft turbosuperchargers for the Bureau of Aeronautics. This extended to 1944, when he formed his own consulting engineering practice. In 1945 he returned to his old home here at DeLaval and has been directing development of gas turbines, special compressors and turbosuperchargers for the DeLaval Steam Turbine Company. Do you see

now why I consider Rudolph Birmann one of the best informed men in this country on what gives with a turbine?

Before I give you a detailed description of the new turbosupercharger, I want to say a few words about Mr. James P. Stewart and why he enters this word picture. President Jim was with Bob McCulloch of the McCulloch Engineering Co. of Milwaukee when the McCulloch supercharger was so successfully merchandised to our industry—some fifteen years or so ago. Then President Jim went with the Elliott Company and learned about turbosuperchargers from them. Then he came down here to Trenton in sales-engineering and, in no time at all, worked himself up to be President of DeLaval Steam Turbine Company.

And so I say to you, my readers, that this team of a salesman who knows what the Diesel Industry really needs in a turbosupercharger and an engineer who knows how to take a different viewpoint and come up with the answer—'tis quite a competitive team.

So now to the new turbosupercharger itself and just a few of my own comments. (1) This unit has a free end. All the working parts are at one end, leaving the other free for intake filter, lube oil filter, pump and heat exchanger, etc., if you don't use engine lube oil circulation. (2) The central

partition assembly is water cooled and offers a smooth surface for diffusion of the hot incoming gases. (3) This unit does not require bifurcated intake manifolds. It does its job with a straight through manifold. (4) The adjustability of the nozzle guide vanes makes it possible for one model to be quickly adjusted to any make of diesel within its capacity.

And now I'm going to become just a reporter, bringing to you, word for word, designer Birmann's description of the DeLaval Turbosupercharger. These are his words, these are his claims:

The course of the development of the diesel engine, from its inception to its present stage, is marked by several distinct milestones. The early diesel engine aspirated air at atmospheric pressure and employed air injection. Later on solid fuel injection was used, and a continuous rating of 80 psi., bmep., was obtained.

The next major step was the provision of an exhaust-turbine-driven centrifugal blower, to pre-compress the combustion air to approximately 1.4 atmospheres. The exhaust turbine was of the blow-down type—that is, it was motivated by the pulsating energy of the exhaust gases. Such low-pressure turbosupercharging brought about an improvement in the engine fuel consumption and the greatly increased specific output of 120 psi. bmep. This increase in engine output and improvement in engine performance, achieved without any change in the basic engine design or its physical size, was so profound that turbosupercharging has become an economic necessity, at

➡ Rotor, within stationary turbine blading shroud and turbine housing—viewed from compressor end.

➡ Turbine housing, with stationary shroud and nozzle ring assembled. Can be adjusted to meet individual requirements.



least for medium and large size four cycle diesel engines.

In recent years, the diesel engine entered the era of high-pressure turbosupercharging, employing inlet manifold pressures of 2 to 3 atmospheres and cooling of the air at these pressures. The ultimate possibilities of high-pressure turbosupercharging have not as yet been reached, but at its present stage of development it has already resulted in further improvement of specific fuel consumption and in full-load engine ratings of 180 psi. bmep.

In view of the many advantages with regard to engine output brought about by high-pressure turbosupercharging, it is rapidly being adopted by the diesel engine industry, making the original low-pressure supercharging system obsolescent.

In high-pressure turbosupercharging, the energy in the exhaust pulsations no longer is sufficient for driving the turbine, as in the case in low-pressure turbosupercharging. Additional exhaust energy must be made available to the turbine by increasing the pressure in the engine exhaust manifold, from which the turbine is supplied. This means that the engine must operate against a definite exhaust back pressure, and for good engine performance it is essential that the inlet manifold pressure be substantially higher than this exhaust back pressure. In effect, the turbosupercharger becomes a low-pressure gas turbine, which produces a net output in the form of difference between intake and exhaust manifold pressures, the input being the heat and pressure energy in the engine exhaust gases.

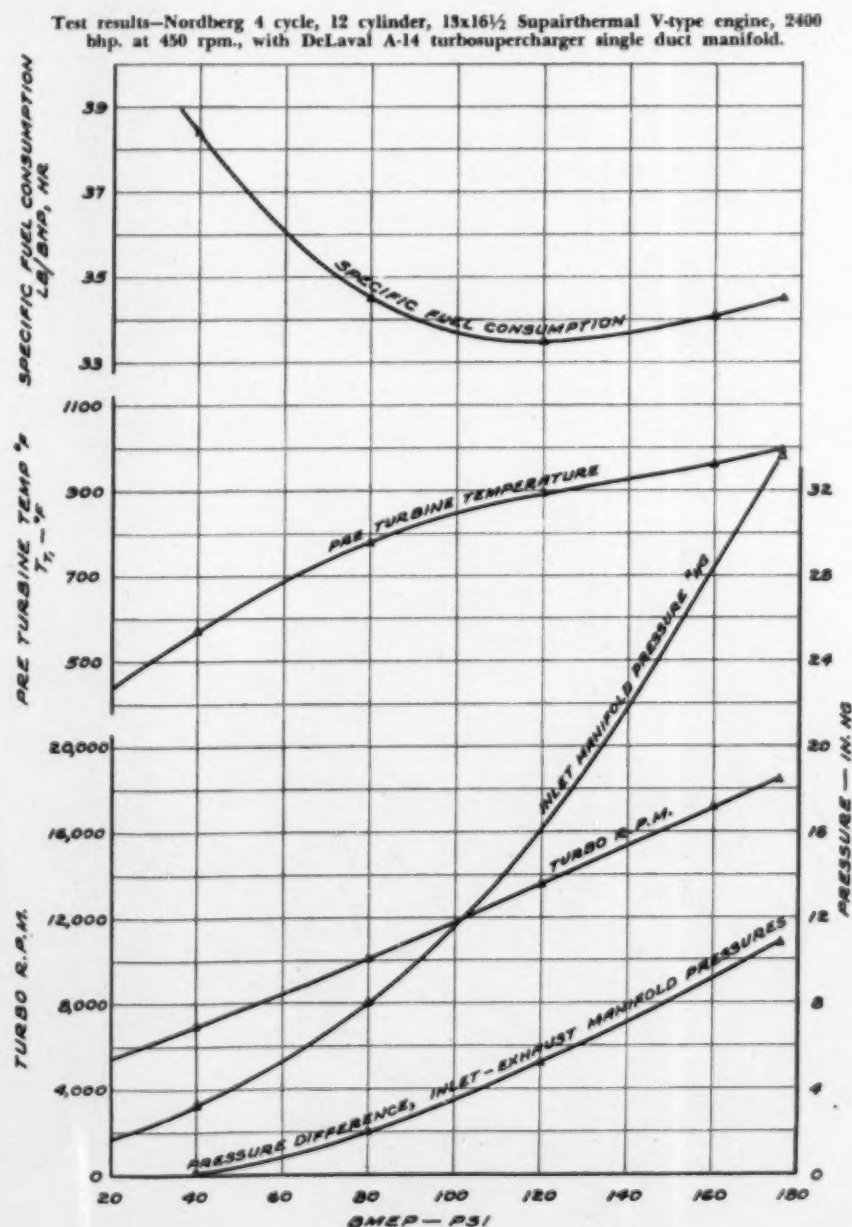
It is well known that in any gas turbine the amount of the net output is very sensitive to the efficiencies of the turbine and compressor. Mediocre or low component efficiencies result in little or no net output of the gas turbine, or, in the case of a high-pressure turbosupercharger, in little or no differential between intake and exhaust manifold pressure, which adversely affects the operation of the engine, particularly with regard to fuel consumption and thermal loading. High component efficiencies bring about a large difference between intake and exhaust gas manifold pressures, which has the following effects: (1) During the scavenging period, or, in other words, during the time when both intake and exhaust valves are open, a large flow of air is forced through the engine cylinders. (2) The scavenging airflow brings about internal cooling of the engine. (3) Residual exhaust gases are thoroughly "washed" out of the engine clearance space, thus eliminating the dilution of the fresh air charge by residual exhaust gases, permitting the compression stroke to begin with the minimum possible temperature, which has a favorable effect on the temperature level of the entire internal engine cycle and on its thermal efficiency. (4) The engine indicator diagram circumscribes a positive area during the suction-power stroke, which means that the engine actually develops net horsepower during these strokes—horsepower power which represents waste heat (contained in the exhaust), converted into net power output by the turbosupercharger and transmitted pneumatically therefrom to the engine crankshaft.

The DeLaval turbosupercharger has been designed and developed specifically for high-pressure supercharging service. The series A model, which has been built in two different sizes—the A-10 and the A-14 is designed for a pressure ratio of 2:1 under full-load engine operating conditions, and slightly higher under engine overload to be capable of producing pressure ratios of 3:1 under engine full-load conditions.

One of the outstanding characteristics of the De Laval turbosupercharger is the high efficiency of the turbine and the compressor, which is the result of many years of painstaking research and experimental work. The compressor is the mixed-flow type, so-called because the air enters axially and flows through and out of the impellers partly axially and partly radially. This type of compressor was originated by DeLaval more than twenty-five years ago, and has gradually been refined aerodynamically and improved structurally, until today efficiencies and performance characteristics are obtained which are substantially better than those which can be achieved with either the axial-flow type or the radial-flow centrifugal type, the latter being commonly used in conventional turbosuperchargers.

A departure from conventional practice was also made in the design of the turbine, because it was found that the desired turbine characteristics and high turbine efficiency could not be obtained by using the conventional axial-flow type of turbine. The mixed-flow centripetal turbine—which DeLaval was the first to develop, beginning as long ago as back in 1928—was found to be much more suitable for service in exhaust-gas-turbine-driven superchargers. One of the many attractive features of the centrifugal turbine is the fact that its blades are very rugged and that they are few in number. In the axial-flow turbine many more blades are necessary, and therefore, they must be comparatively narrow and delicate.

In comparison with all turbosuperchargers presently on the market, the DeLaval type is unique with regard to the construction of its rotor. The mixed-flow impeller and the centripetal turbine wheel are combined in a single rotor structure in which the compressor blading is carried on one side of the rotor hub and the turbine blading on the opposite side. This arrangement eliminates all parasitic losses such as turbine and compressor leakage, windage and friction of non-working surfaces—losses which are unavoidable in conventional de-



signs employing separate compressor and turbine rotors. By eliminating these losses, the turbine and compressor efficiencies are substantially improved, over and above the improvements already achieved by the aerodynamically highly improved mixed-flow compressor blading and the refined centripetal turbine blade configuration. This so-called "Monorotor" construction offers the additional advantage of extreme simplicity, eliminating a great number of parts such as air and gas seals and partition walls. The blades of both the compressor and the turbine are open along their entire tip contour, and their configuration prevents accumulation of dirt, with its resulting loss of performance.

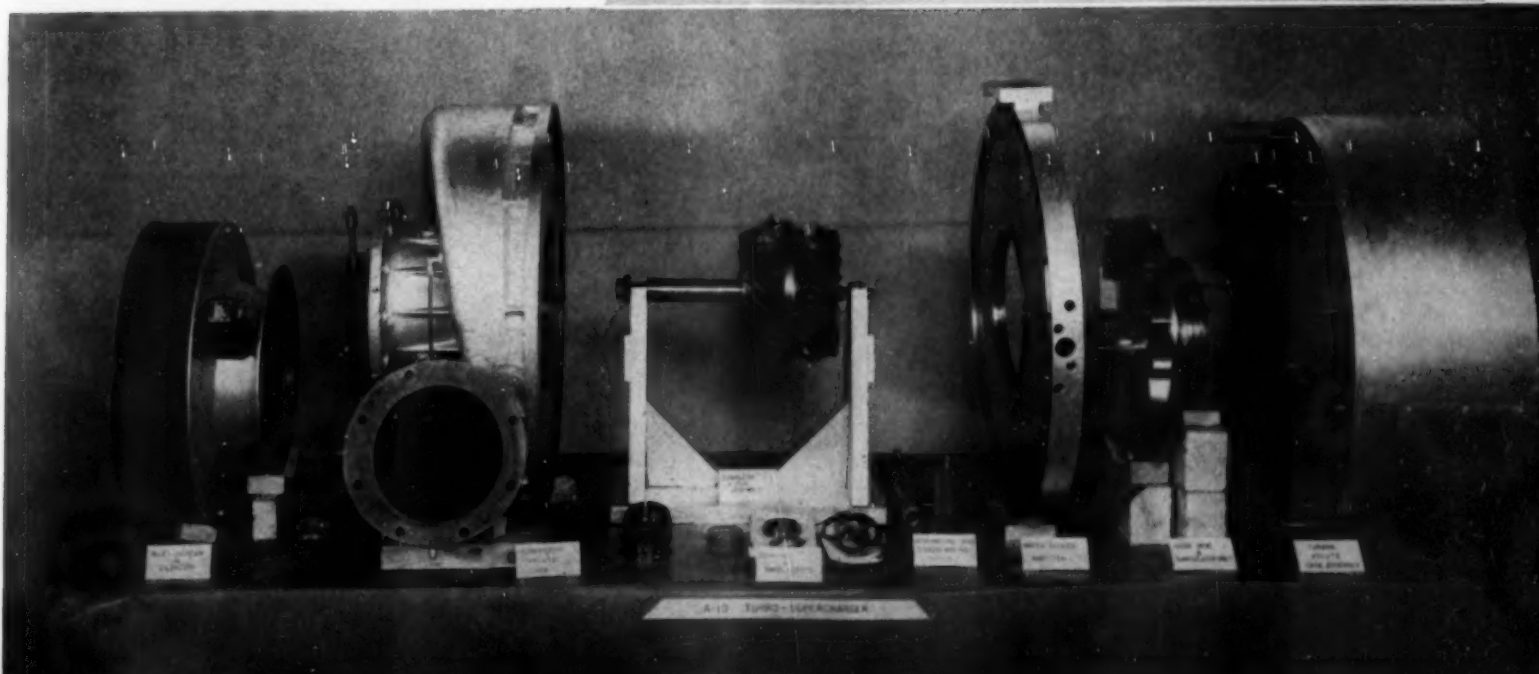
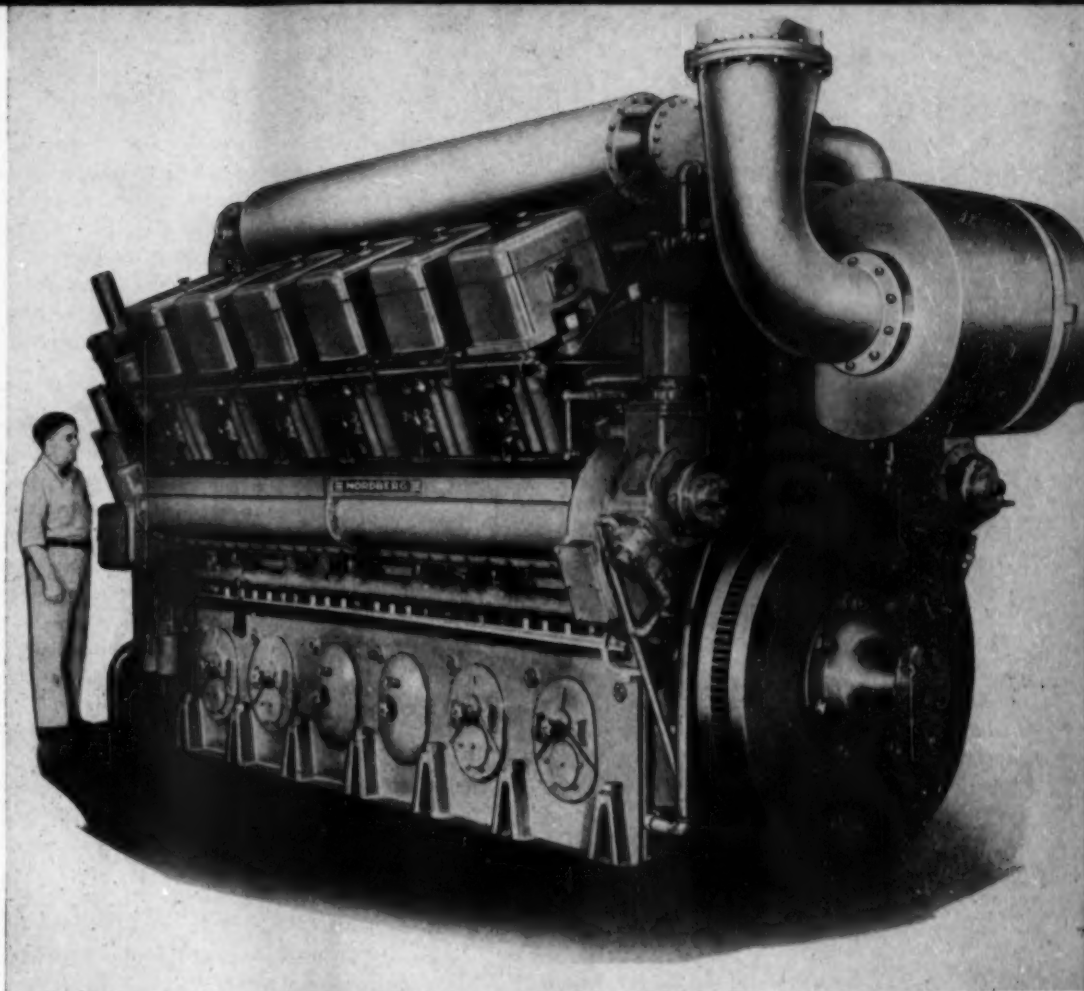
The overhung rotor is bolted to the end of the shaft by means of a single central tie bolt. The shaft is journaled in two bearings, located on the cold side of the rotor and contained in a common bearing housing that is an integral coaxial part of the compressor inlet casing. Both bearings are of the steel-backed, copper-lead lined type. The end faces of the outboard bearing serve as thrust bearings by cooperating with thrust collars carried on the shaft, thus serving to locate the rotor and carry its slight axial thrust. Both bearings are so arranged that they can be removed and inspected in a few minutes, merely by taking off the bearing end cover and without further dismantling the unit. Oil to the bearings can be supplied from the engine lubricating system, or, if desired, a separate, self-contained lubricating system can be furnished with the turbosupercharger.

The mixed-flow compressor has an axial air inlet and a vaneless diffuser, terminating in a scroll hous-

Above, Nordberg 4 cycle, 12 cylinder, 13 by 16½ Supairthermal V type diesel engine equipped with a DeLaval A-14 turbosupercharger.

Turbosupercharger completely assembled including turbine lagging and pulse converter. ➡

Exploded view of the model A-10 turbosupercharger showing, left to right: (1) inlet screen and silencer. (2) compressor volute case. (3) complete rotor assembly. (4) bearings and small parts. (5) assembling and disassembling tools. (6) water-cooled partition. (7) guide vane and shroud assembly. (8) turbine volute case assembly.



ing, from which the air is discharged tangentially. The use of a vaneless diffuser is largely responsible for the wide compressor operating range, and makes the compressor capable of efficiently serving a variety of engines having different airflow requirements.

The turbine nozzle box receives the engine exhaust gases in a tangential direction, through a single inlet, and contains the turbine nozzle guide vanes which provide for full admission in all applications. These guide vanes are arranged between two radial walls, and are so mounted on one of them that they can readily be pivoted to change the nozzle area. This feature eliminates the need for installing different nozzle rings to adapt the unit to different operating conditions, and permits rapid matching of engine and turbosupercharger. In some units a mechanism has been incorporated which permits adjusting the guide vane position from the outside, during operation of the turbocharger. This externally-adjustable guide vane mechanism is invaluable when used as a tool to rapidly perform a series of tests leading to the best matching of turbosupercharger and engine. It can also be used for varying the turbosupercharger rpm. with changing engine load or speed, to achieve various engine operating characteristics, such as high torque at low engine rpm.

The guide vanes direct the flow of exhaust gases radially inward into the turbine blades, from where they are discharged into the passages formed by the blades of the turbine wheel. The exhaust gases are then discharged into an exhaust diffuser, which is coaxial with and a part of the turbine housing. This diffuser serves to recover some of the kinetic energy represented by the leaving velocity at the discharge from the turbine blades, and to convey the gases to the turbine discharge opening.

The turbine housing is made from a heat-resisting alloy, and is insulated and lagged instead of being

water-cooled. The turbine nozzle box is separated from the compressor housing by a central partition diaphragm, which is hollow for internal water circulation. It is the only water-cooled part of the entire unit. Tests have shown that the amount of heat rejected to the small quantity of cooling water required is insignificant compared with the heat carried away in the cooling water for the commonly-used turbine casing cooling jackets.

The "Monorotor" construction of the turbine wheel and the compressor impeller permits cooling the turbine side of the rotor in a very simple manner, by by-passing approximately 5% of the air handled by the compressor over the periphery of the rotor to the turbine. The air so by-passed flows in the form of a thin sheet over the turbine rotor hub, blanketing it from the heat of the blades. This cooling effect is augmented by the provision of cooling airflow through the hollow interior of the rotor and through cooling passages directly adjacent to the turbine blade roots. By being intensively cooled in this fashion, the turbine is capable of safe operation with the highest temperatures encountered in diesel engine service, because the metal temperatures are reduced to values for which the time-to-rupture is virtually unlimited.

The full admission of the turbine and its undivided nozzle box makes the DeLaval supercharger different from conventional designs. Full admission is necessary if maximum turbine efficiency is to be achieved. Full admission is not possible, however, in conjunction with the well-known 'blowdown' system, which has found wide application to four-cycle diesel engines. The objective of the 'blowdown' system is the utilization of as much of the

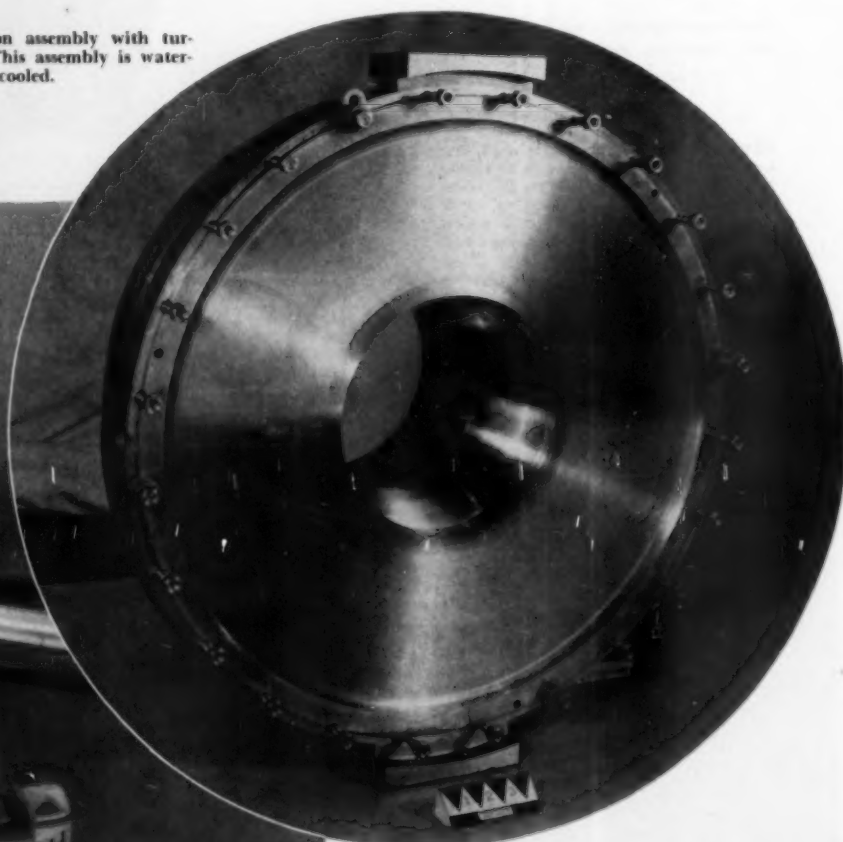
pulsating exhaust energy as is possible. For this purpose the engine exhaust manifold is subdivided into separate branches, so arranged that the exhaust gases from any one cylinder, or from groups of two or three cylinders having non-overlapping exhaust periods, are segregated and discharged into the turbine through separate groups of turbine nozzles. This involves, momentarily at least, partial turbine admission and pulsating flow through the turbine—both of which adversely affect the turbine efficiency.

The DeLaval turbine operates with full admission and steady flow at all times. To recover the pulsating portion of the exhaust energy, the several branches of the exhaust manifold are connected to the single turbine inlet by means of an adaptor piece called the 'pulse converter adaptor.' This device is capable of concerting the pulsating portion of the exhaust energy into a pressure rise, with the result that the pre-turbine pressure is higher than the mean pressure in the exhaust manifold. The difference between pre-turbine pressure and mean exhaust manifold pressure represents that part of the energy of the exhaust pulsations which is made available to the turbine. The turbine by virtue of its full admission and steady flow, can then convert this energy with maximum efficiency into the output.

From the brief description given, it can be seen that in almost all essential respects the design of the DeLaval turbosupercharger departs from standard practice, solving in a new and unique way the problem of better utilization of the exhaust energy to precompress the combustion and scavenging air of a diesel engine.

Rotor, three-quarters view from shaft end.

Central partition assembly with turbine housing. This assembly is water-cooled.



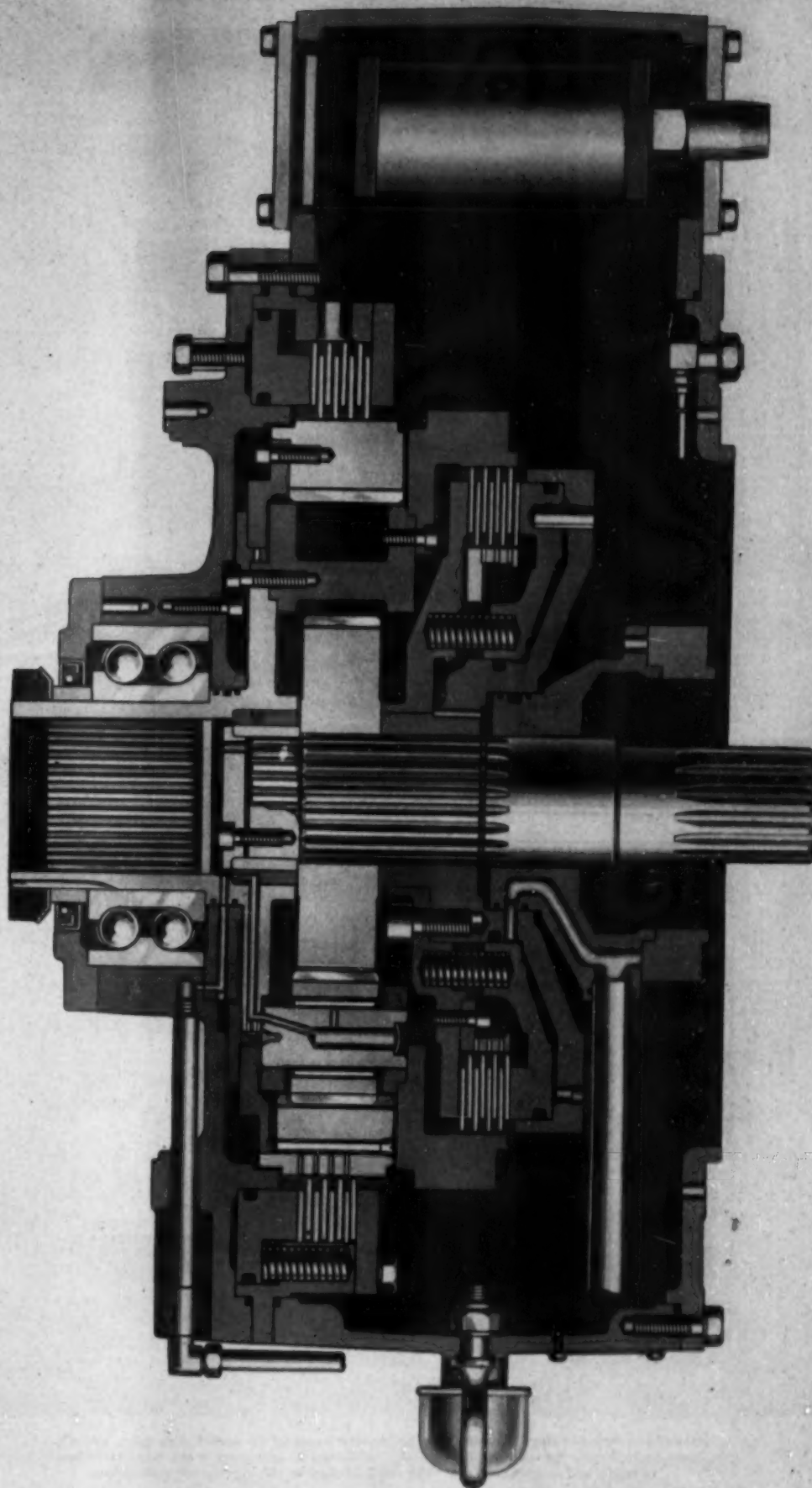
FOUR NEW TWIN DISC DRIVES

By W. L. BODE

FOUR completely new industrial drives—developed to help increase performance, extend utilization, and reduce maintenance of dieselized installations throughout industry—have been announced by the Twin Disc Clutch Company. The new drives include a two-stage hydraulic torque converter, a 2-speed oil-actuated transmission, a disconnecting hydraulic power take-off, and an air-actuated clutch. The new two-stage hydraulic torque converter was developed to fill the gap in industrial hydraulic drives, and is particularly adaptable for dieselized equipment in the oil fields and logging industry, as well as on- and off-highway hauling throughout construction, mining, and other major industries. Providing maximum operational efficiency, the Twin Disc two-stage design develops up-to-4:1 torque multiplication at stall, combined with progressively increasing engine speed during acceleration and uniform pull-down under load. Thus it meets the requirements of certain engine applications needing converter drive with specific performance characteristics.

Principal feature of the Twin Disc two-stage converter is its freewheel reaction or stator blades, which provide complete unloading of the engine at high-speed, no-load conditions—with low horsepower absorption for greater economy, and with minimum cooling requirements. Basic two-stage converter unit is the Model S, which offers a standard spider drive input, and is equipped with a built-in converter charging pump around the input shaft—just adjacent to the drive spider. Inlet and outlet connections are provided for piping the converter fluid to and from a cooler, which can be either an oil-to-water heat exchanger or an oil-to-air radiator. Two types of output shafts will be available: (1) straight shaft extension type, which will be mounted on maximum bearing centers and have an adequate rear bearing to handle side loads, and (2) flanged shaft type, to permit use of a "U" joint connection for in-line drives.

Twin Disc has also designed the new two-stage converter in a disconnecting type, called the Model SD, shown in the illustration. Essentially the same as the basic Model S unit described above, the

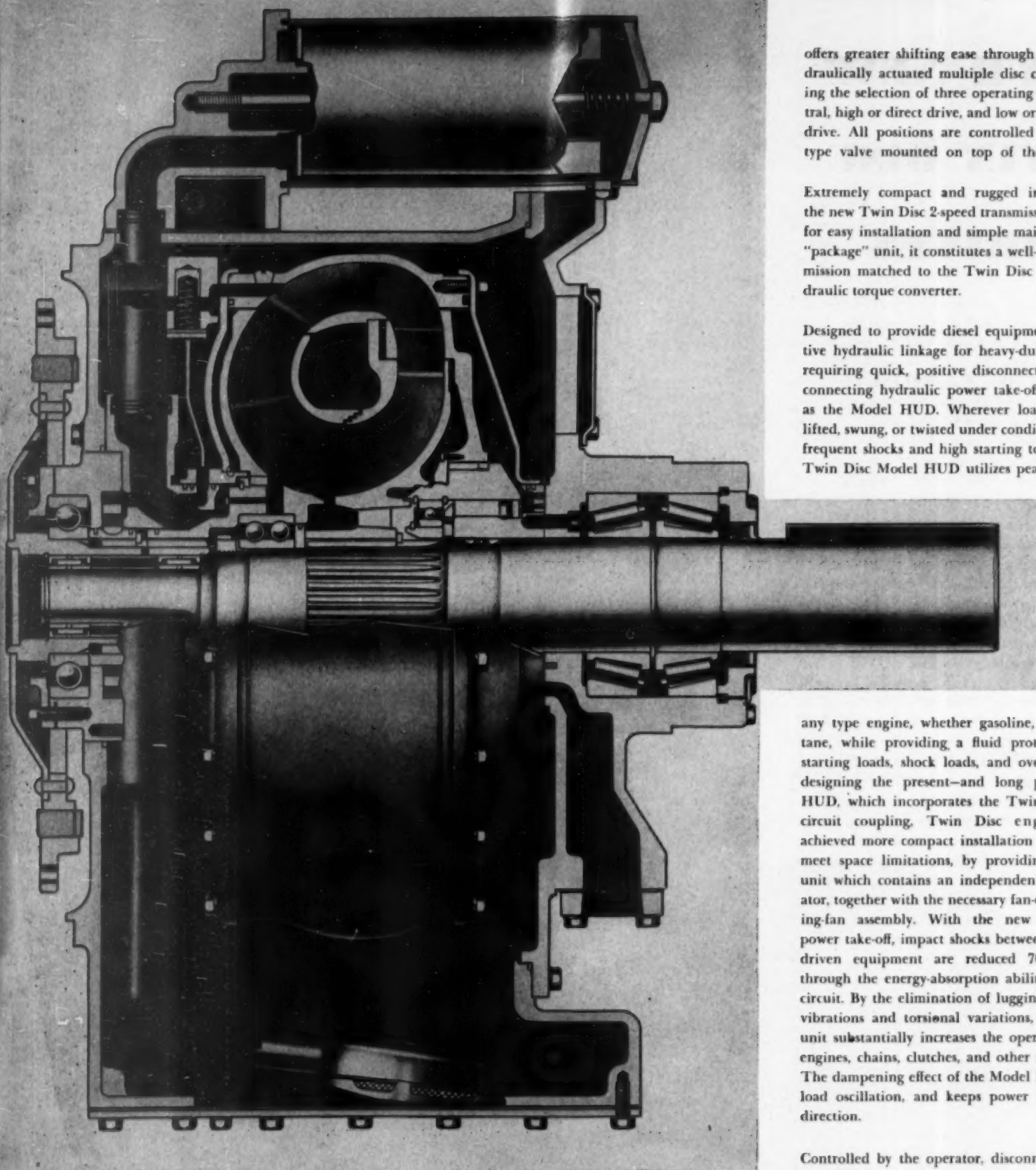


New Twin Disc 2-speed transmission, model T-302, designed to give three-stage torque converters extended performance within maximum operating range.

Model SD incorporates the additional design features of (1) quick-release dump valves on the rotating turbine wheel, to permit release of the oil from within the converter circuit—providing a complete disconnect feature; and (2) a 2-position con-

trol valve, located on top of the stationary converter housing—for actuation of the dump valves.

Particularly compact in size, the Model SD's overall length is considerably less than a converter



New Twin Disc two-stage hydraulic torque converter (model SD with Spider drive and disconnecting feature shown), will be available in industrial and truck types, with variations of input and output ends and of internal blading to suit specific requirements.

equipped with a conventional friction clutch between converter and engine. The new 2-speed oil-actuated transmission was developed specifically for use with three-stage torque converters, which are being used today on many diesel installations in industry. Designated as the Model T-302, it is engineered to obtain improved performance in torque converter installations by providing a dual range

of converter operation. The unit is equipped with a direct drive and single stage planetary gear system. Two ratio spreads are available: direct drive and 2.69:1 reduction, or direct drive and 3.07:1 reduction ratio.

In addition to the extended range of performance obtained, the new Twin Disc 2-speed transmission

offers greater shifting ease through the use of hydraulically actuated multiple disc clutches providing the selection of three operating positions: neutral, high or direct drive, and low or reduction gear drive. All positions are controlled from a spool-type valve mounted on top of the transmission.

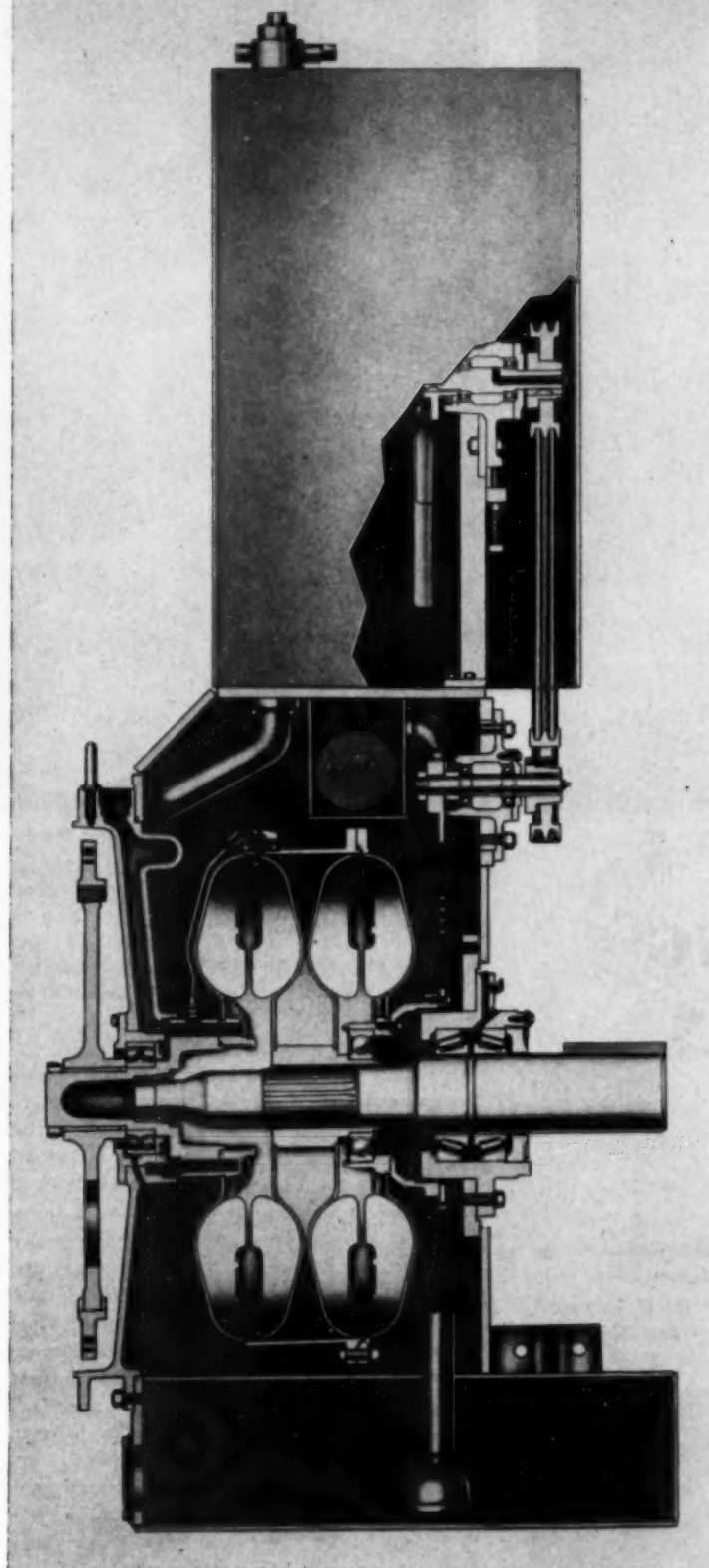
Extremely compact and rugged in construction, the new Twin Disc 2-speed transmission is designed for easy installation and simple maintenance. As a "package" unit, it constitutes a well-designed transmission matched to the Twin Disc three-stage hydraulic torque converter.

Designed to provide diesel equipment more effective hydraulic linkage for heavy-duty applications requiring quick, positive disconnect—the new disconnecting hydraulic power take-off is designated as the Model HUD. Wherever loads have to be lifted, swung, or twisted under conditions involving frequent shocks and high starting torque, the new Twin Disc Model HUD utilizes peak torque from

any type engine, whether gasoline, diesel, or butane, while providing a fluid protection against starting loads, shock loads, and overloads. By re-designing the present—and long proven—Model HUD, which incorporates the Twin Disc double-circuit coupling, Twin Disc engineers have achieved more compact installation dimensions to meet space limitations, by providing an integral unit which contains an independent cooling radiator, together with the necessary fan-drive and cooling-fan assembly. With the new disconnecting power take-off, impact shocks between driving and driven equipment are reduced 70% or more, through the energy-absorption ability of the fluid circuit. By the elimination of lugging and stalling, vibrations and torsional variations, the hydraulic unit substantially increases the operational life of engines, chains, clutches, and other running parts. The dampening effect of the Model HUD prevents load oscillation, and keeps power steady in one direction.

Controlled by the operator, disconnection on the Twin Disc disconnecting hydraulic PTO is actuated from a master control valve, which operates differential pressure valves to dump the oil within the HUD into a reservoir in a matter of seconds.

New type rubber diaphragm valves operating in a radial direction accurately allow for fluid dumping and re-filling. Release is complete and positive, without the bother and space-consuming necessity of engine cut-off clutches. The new HUD eliminates the critical problem of coordinating engine throttle, drum clutch, drum brake, etc. Now the drum clutch can be engaged with engines idling.

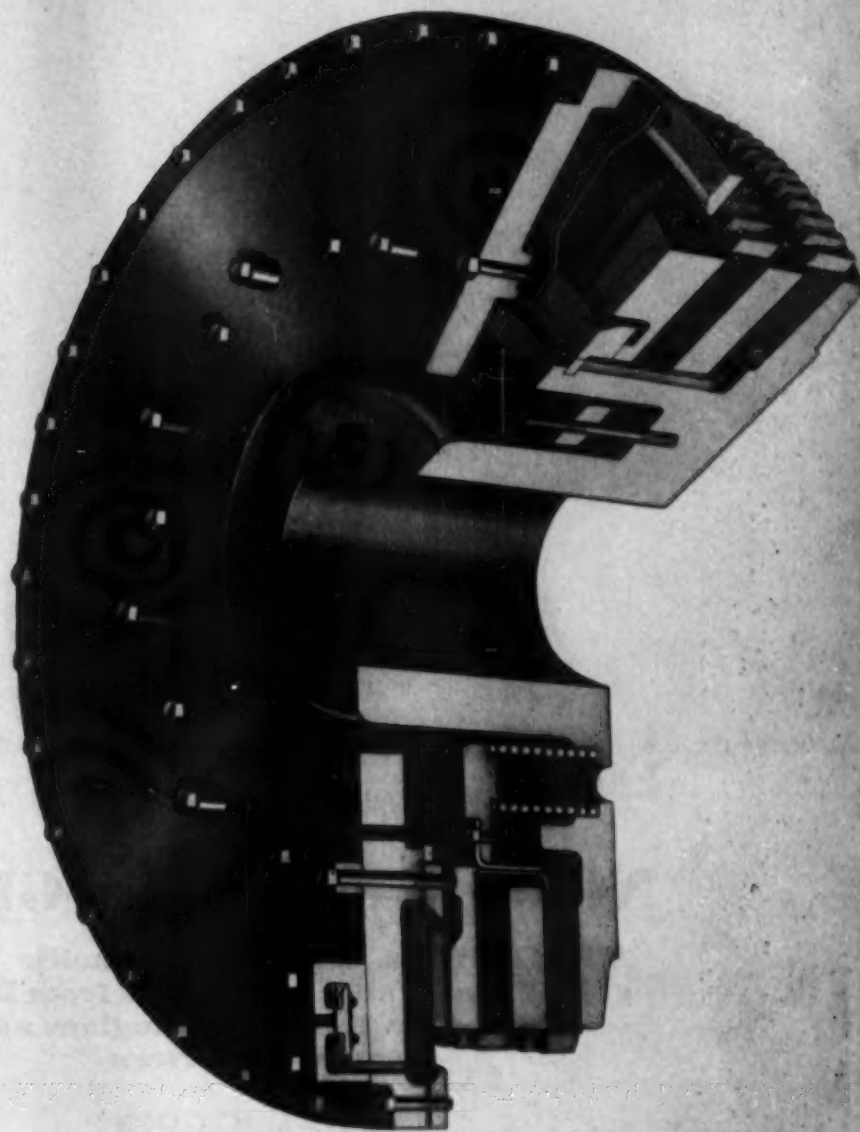


New Twin Disc disconnecting hydraulic power take-off, model HUD, available in coupling sizes 21-in. and 27-in., to handle 60 to 600 hp. engines. Contains independent cooling radiator, with fan-drive and cooling-fan assembly.

The load can be picked up easily, simply by opening the throttles. Multiple engines can be synchronized while operating at slightly different speeds. Compactly designed for limited space application, the new Model HUD, disconnecting power take-off is available in coupling sizes 21 and 27 in.—to handle up to 600 hp. engines.

The new Model PO air-actuated clutch is engineered for greater torque capacity, and offers users

of diesel equipment a remote-controlled friction drive lighter in weight, and more narrow in width than the conventional air-actuated clutch. This unusual compactness permits the new Model PO Clutch to be installed in less shaft space, with closer shaft-bearing center distances. A single set of air-cooled springs assures faster, more trouble-free plate release and equal distribution of release pressure. Air actuation is effected through insulated and air-cooled diaphragms—and is unusually



New Twin Disc air-actuated clutch, model PO, one of a series designed for lighter weight and higher torque capacity, with narrower clutch width.

smooth and accurate. Built to maintain maximum efficiency even under adverse operating conditions, the new model PO air-actuated clutch has all parts fabricated from specially developed alloys, for maximum strength to withstand heavy shock loads and tooth wear.

Because of the greater and more uniform actuating pressure on the new PO, its capacity far exceeds that of mechanically loaded clutches of the same size. Actually, the capacity of the new model PO air-actuated clutch is given on a basis of working torque capacities rather than actual break-away torque, in line with Twin Disc's long-established policy. Offered at present in two and three plates, 24 in. size, the new Twin Disc Model PO air-actuated clutch is already drawing keen interest from leaders in equipment design. Twin Disc's new series of air-actuated clutches has been designed to offer a selectivity of standard models to fit any job—where remote control is desired, and complicated linkage cannot be tolerated.



An HD-9 with GM Detroit Diesel engine skidding logs to landing at Singer Reserve on contract for the Chicago Mill & Lumber Co., of Tallulah, La. Owned by J. E. Shevers, Oak Grove, La.



An HD-20 powered by a GM engine, with Carco dozer and winch. Arcata Redwood Logging Co., Arcata, California. The HD-20 builds logging

NOW WE'RE LOGGING

Allis-Chalmers Officials at Pacific Congress Recall Years of Progress from Diesel Tractors in 1928 to GM Engines and Torque Converters

By F. HAL HIGGINS

“WE no longer make a gas crawler and the logger can't, or won't, buy anything but dieselized equipment for his heavy jobs. In fact, since 1940, the diesel engine for power has been

pretty well accepted by the logging industry.” So was the place of the diesel summed up in the western logging industry by H. T. Larmore, Industrial Equipment Manager, Tractor Division, Allis-

Chalmers Mfg. Co., who was out from Milwaukee for the 43rd Pacific Logging Congress in San Francisco late in 1952.

Mr. Larmore was picked by his group of western branch managers from Oakland, Los Angeles, Portland and Seattle, to speak for the Allis-Chalmers group of visitors. Among the A-C group on hand for the Congress were: Frank Mussell, vice president and general manager; A. E. Dorn, industrial sales manager; A. B. Layman, service manager; H. J. Masuhr, industrial advertising manager; Wes Davis, West Coast division manager, all from the home office in Milwaukee. From the West, George Schierman, Oakland branch manager; S. C. Skiman, industrial sales manager, Oakland; L. D. Benedict, branch manager, Los Angeles; Frank Bryson, industrial sales manager, Los Angeles; A. E. Mills, branch manager, Portland, Oregon; and his two industrial sales managers, Harold Appel and W. N. Bryant for the Northwest area; J. W. Duddleson, district manager, Seattle, for British Columbia and Yukon territory; Harvey Beachler, service supervisor for the California area.

“Give this western U.S. logger credit for having the vision and guts to try out and go along with the manufacturers in the development period of the diesel tractors and engines powering all the logging equipment we see today,” remarked Mr. Masuhr as he reviewed the mighty battle of the diesel to lick ring, liner, and bearing troubles. Cooperating in this effort were the western oil



Allis-Chalmers HD-5G with GM diesel working for the Orick Lumber Company of Orick, California.



roads, yards or skids timber and also is used to prepare homesites for company employees at the town of Orick, Calif.



Model HD-15 bulldozing logging roads with Baker dozer, building primary, secondary and spur roads. Engine is GM Detroit Diesel. Owned by Corcoran Pulpwood Company of Bozeman, Montana.

company technicians and the many painstaking trials of all the various high speed diesels that were sent out to logging camps to fight against the ruggedest tests of "he-man" pioneering to be found anywhere in the world.

"This western logger did a magnificent job of stretching his over-worked logging equipment during the period of World War II when he couldn't get enough new diesel equipment. He had then to limp along on old gas and steam powered equipment until he had a chance of getting diesel engines. Hence, the line-up of a tremendous backlog demand for diesels with the war's end when Government slowed down its demands and allowed industries to begin the long job of re-equipping with the latest dieselized machines.

"In a general way, this situation can be covered by merely saying that the logging industry now accepts the diesel to the point that no other kind of tractors are utilized. We in Allis-Chalmers now have four diesel models each powered by a GM engine. These models are the HD5, HD9, HD15, and HD20. Since the end of war, we have given the industry a complete new line of crawler diesel tractors and blade graders that help make and maintain the logging roads. I think it is safe to say that the diesels have made the logging business cheaper, met the demands of Government and home builder, reduced fire hazards, cut loss of gas from leakage and theft, and enabled lumber to hold its dominant place in the nation's

economy despite the promotion of wood substitutes."

Asked about the line of diesel motor graders offered by Allis-Chalmers for the logger to smooth the path of truck logging, the A-C official put it in these words: "We offer the Allis-Chalmers motor grader in four models for logging road construction and maintenance. This trend of highway construction by the logging companies to connect up their timber operations with the state and county highways has brought maintenance costs way down. Many inaccessible areas of virgin timber that could not have been logged successfully by old steam railroads and donkey engines have been opened up. Good roads for the logging

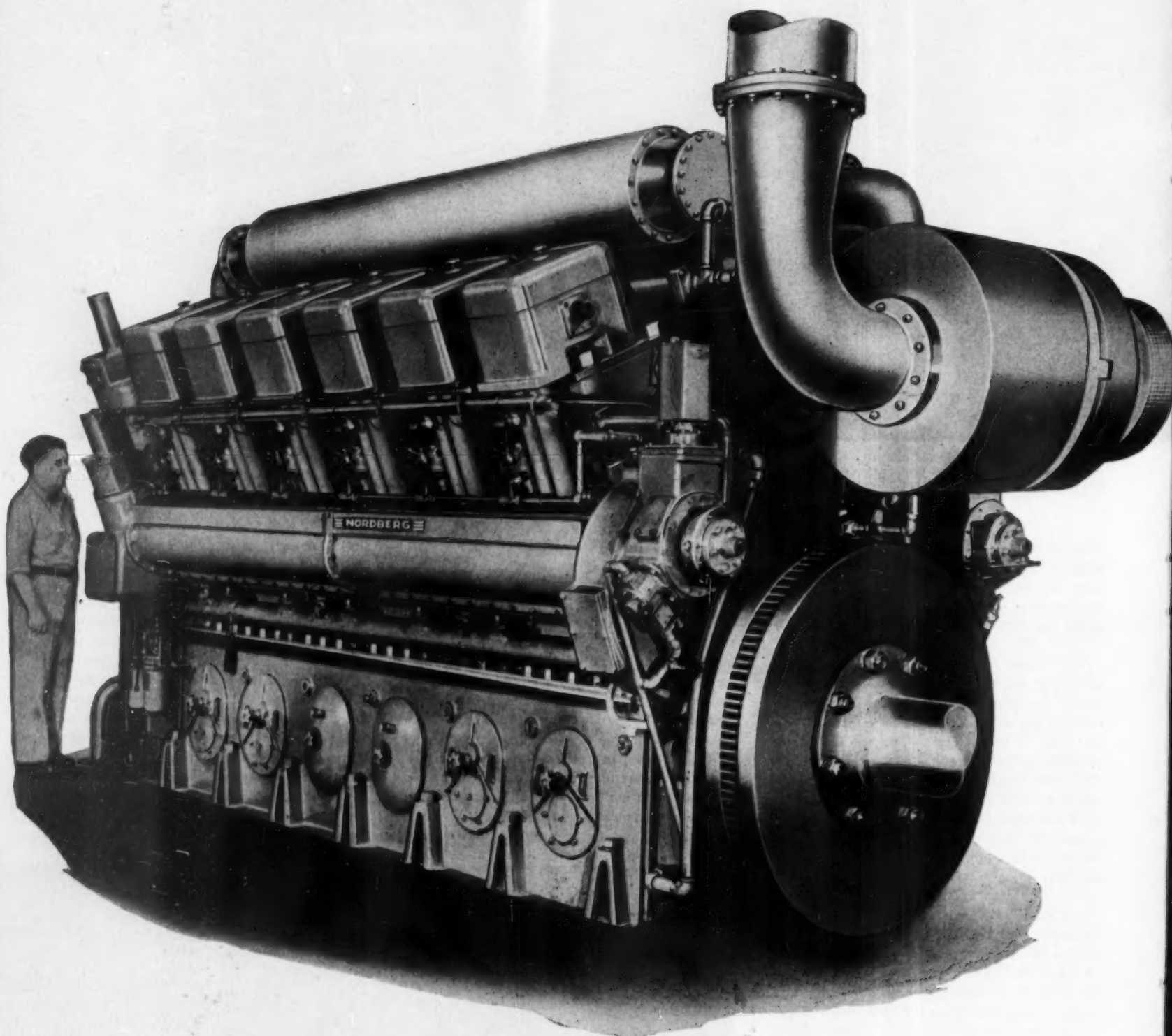
trucks has brought truck maintenance way, way down compared with the old days when they tried to log over poor and inadequate roads.

"Our diesels with torque converters, pioneered in the HD20, have really given the diesel tractor with bulldozer a key job in modern logging in the U.S. We are proud that we were here in the West with it and took it through to its high success of today. A lot of history has been made in many fields since. But the logging history is one of achievement over stubborn obstacles with many cooperative efforts to get results. Oil, machine and the indomitable spirit of the western logger each had its share in the victory. But with diesels—now we are really logging!"



GM-Detroit-Diesel engine HD-5 logging 20 miles northeast of Hamburg, Ark. Owned by Blankenship Bros., Crossett, Ark.

NORDBERG NEW V-TYPE LINE



Nordberg four-cycle, 12 cylinder Supairthermal V-Type Diesel engine rated 3200 hp. at 600 rpm. with DeLaval turbosupercharger installed.

AS another step in its program to manufacture a wide range of highly efficient prime movers, Nordberg Manufacturing Company, Milwaukee, Wisconsin announces production of a series of four-cycle Supairthermal V-Type engines for stationary

and marine services. These engines are designed to meet the increasing demand for heavy duty prime movers of moderate weight and small physical dimensions. They are built in 12 or 16 cylinders of 13 in. bore and 16½ in. stroke covering a range

from 2400 to 4260 horsepower at 450 to 600 rpm.

The design of these engines incorporates all performance features of Nordberg 13 in. bore in-line Supairthermal engines and many of the important

parts of the V-Type engine are identical and interchangeable with the in-line type engine. The Supairthermal principle of operation—completely proved in both stationary and marine service—gives substantially more horsepower per cylinder at high thermal efficiency. Nordberg Supairthermal V-Type engines are designed and built for liquid fuel, dual-fuel or spark-fired gas operation. As a diesel, the engine burns a wide range of fuel and crude oils. For dual-fuel operation, the engine burns various types of gaseous fuels with only a small percentage of pilot oil to control combustion. In case of any interruption in gas supply the engine will automatically change to liquid fuel without affecting speed or load. As a spark-fired gas engine, it will burn natural gas, butane, propane, manufactured gas and sewage gas using a dual spark ignition system.

The cross section shows the compact design and heavy duty construction of this Supairthermal V-Type engine. The included angle of the two banks of cylinders is 45° and the offset between cylinders working on each crankpin is $4\frac{1}{4}$ in. The net weight of the 12 cylinder engine is 96,000 lbs. and the 16 cylinder engine, 122,000 lbs. This does not include the weight of the flywheel and extension shaft on stationary engines or the flywheel, thrust bearing or thrust shaft for marine engines. The inlet air manifold and single duct exhaust manifold are located directly under the intercooler housing. The intercooler, of the two-pass type, extends the full length of the engine. For stationary application, the turbocharger is positioned on the free end of engine and in marine propulsion, it is installed at the drive end. To provide maximum strength and rigidity in the entire engine structure, the crankshaft is carried in the frame and is supported by the lower transverse members. The steel bearing caps are keyed to these members and are held in place by two steel through bolts. The crankshaft, of counter-weighted design, is made from a heat treated alloy steel forging. Oil passages are drilled through the bearings journals and crank checks for pressure lubrication.

The rugged construction of the Nordberg V-Type engine results from the application of heat treated alloy steels in the engine frame, bedplate, crankshaft, connecting rods, etc. The frame itself is a rigid and compact integral member of welded steel plate which has been carefully stress-relieved.

Heavy sections between the top and bottom members of the cylinder compartment and upper main bearing supports transmit the forces of the combustion gas directly to the top deck of the frame.

One of the unique features of this engine is the simplicity of cylinder construction. Removable cast iron liners seat in individual cast iron jackets. This construction permits directed flow of water for more efficient cooling. The entire cylinder assembly with liner is easily removable without disturbing the cylinder liner water seals. For maximum cooling, the exhaust and intake valves are seated directly in the cylinder head. Cooling water flows from the cylinder jacket to the cylinder head

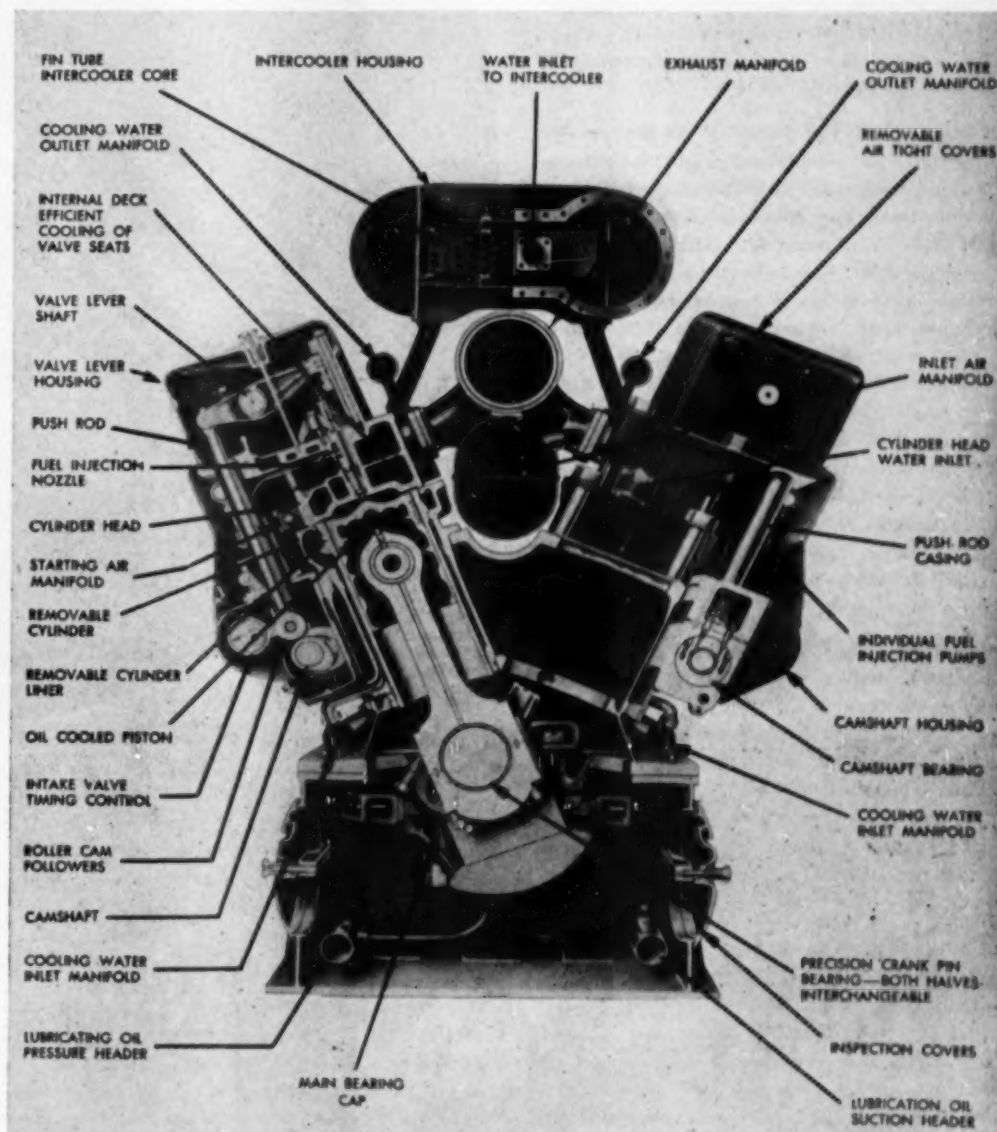
through accessible outside connections. This eliminates use of grommets and any special gaskets. Also, the design of the cylinder head provides velocity circulation of cooling water around the valve seat areas.

All moving parts of this V-Type engine are pressure lubricated. With this system, rotary type lubricating oil pumps are driven by roller chain from the end of the crankshaft. Oil flows under pressure through strainers, filters and coolers to an oil header located in the bedplate of the engine. From the oil header, individual oil lines lead to each main bearing cap, the gear compartments at each end, the camshaft bearings and the valve levers. Fuel systems on this Nordberg engine are designed for minimum maintenance and best overall efficiency depending upon type of operation. For oil operation, a constant stroke fuel injection pump of the variable cut-off type is mounted on the camshaft housing adjacent to the cylinder it serves. Easily removed fuel nozzle holders are located in the cen-

ter of the cylinder head and are provided with spring loaded valves and multiple hole tips. For Dual-fuel operation a hydraulically actuated gas admission valve is mounted in the cylinder head. A similar valve is also employed on the spark ignition engine. In addition two spark plugs are used per cylinder and low tension impulse generators, rectifiers and transformers are used to assure dependable and complete combustion. Hydraulic relay type overspeed and control governors are mounted at the flywheel end of each engine type.

The compact design, wide horsepower range and high efficiency of the Nordberg Supairthermal V-Type engine makes it ideally suited for continuous, economical operation in many stationary power applications and several engines are now on order for pipeline pumping and generating service. The marine diesel engines are available in direct reversing types for direct drive, single or multiple drive through reduction gears with electric or hydraulic couplings or for diesel-electric drive.

Cross section through the Nordberg four-cycle Supairthermal V-Type Diesel engine.



\$3,000,000 HOUND HOSPITAL

**Pacific Greyhound's New Maintenance Center
in San Francisco Designed to Keep Busses Rolling
With Aid of Diesels**

By F. HAL HIGGINS

THE \$3,000,000 maintenance center of Pacific Greyhound Lines is ready and operating as smoothly and efficiently as its transportation system. Not only is it the proverbial "last word" in a newly completed structure, but is equipped, manned and managed for service that is keeping GM powered Greyhounds operating over thousands of miles of terrain, carrying millions of passengers on schedule with a minimum of road failures.

One of the intangible qualities of this Greyhound maintenance center that caught the attention of the writer after three visits and interviews with General Superintendent, R. M. Aherns, his assistant, J. B. Rice, Foreman Bruno Felizanetti and Bert Herrick of the machine shop was Aherns' sense of practical perfection. From the top officials down through the ranks of the Center and over at the advertising agency handling Greyhound publicity, the writer had the impression that this new maintenance center was Mr. Aherns' dream come true. Now that the place is ready and running, the writer agrees with plant officials and personnel who have worked with Mr. Aherns that this is a new plant running as it should right from the outset.

Here is the story of Aherns' dream center for Greyhounds as he planned and ordered it executed to a grand total of \$3,000,000 for land, buildings and equipment. Top officials including President F. W. Ackerman commended Mr. Aherns with these words, "Mr. Aherns has been in the transportation business for 40 years and with Pacific Greyhound since it was founded in 1929. Before that he served with one of the predecessor root companies, California Transit Company. He has a fine reputation as a bus builder in his pre-Greyhound days. This new Center fulfills a long cherished dream of Aherns. He has personally supervised its construction and is responsible for conceiving and designing its modern time-saving features which make it such an outstanding plant for servicing the buses for Greyhound and better serving the riding public."

Construction of the Center began in February 1951, and work is completed with the exception of a few finishing touches in progress as this is being written. Barrett & Hilp, prominent in San Francisco building circles, was the general contractor. Architects included: Skidmore, Owings, and Merrill of San Francisco. The center is located on a 825 by 240 foot lot bounded by Seventh, Eighth, Hooper and Irwin streets, San Francisco.

Three shifts of skilled workmen keep the Center operating round the clock in 8-hour periods to service the 1150 Greyhound busses in operation throughout the United States. It is the newest, largest and most complete of any bus or truck service in the country. "Every square foot of floor space and every piece of equipment in the Greyhound Maintenance Center has been planned and

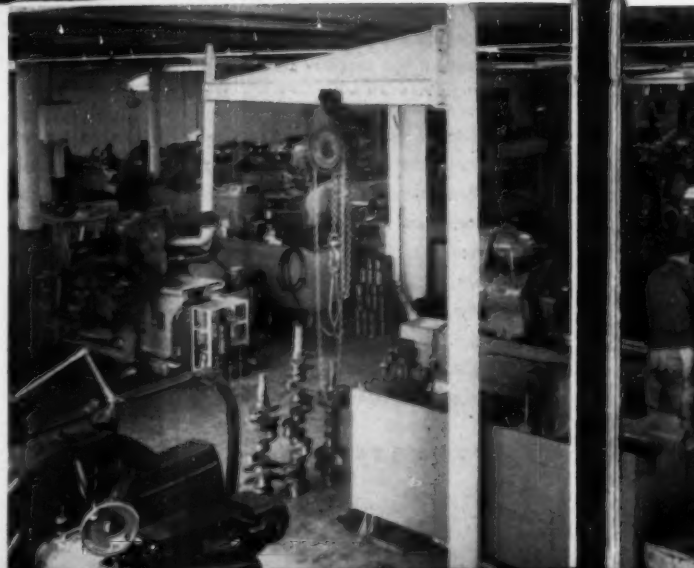
installed with employee safety and well being in mind," says Mr. Aherns, who knows his men and their problems in working on busses and the engines that power them. The choice of arrangement of machines in the unit dismantling section, unit repair shop and machine shop is a fine example of Aherns superior judgment and planning ability. There is room enough for the 50 to 60



Air view of the Greyhound bus maintenance center. Standard Oil Co. of California distributing center in left background.

employees at work on the various machines, and no crowding or elbowing to distract one man from his job or endanger his safety. There is a test room where the rebuilt GM diesels are taken in before being sent down to replace an engine out of a bus which is just in for an overhaul; a steam cleaning room for all units, a welding shop and an electrical department, first aid room, locker room, wash rooms, showers and a cafeteria.

One could almost play a football game in the 400 ft. x 153 ft. general service area on the main floor. Here the tired and limping Greyhounds come in for doctoring and grooming before going back on the road ready to carry capacity loads of pas-





Greyhounds over the pits as mechanics work under and behind them. Building seen through far entrance services 550 busses a day, washing and greasing them.

sengers over all types of terrain and in every kind of weather condition. The ceiling is 25 feet above the floor with fluorescent lighting and pipes carrying air to power tools at each pit from a pair of Ingersoll-Rand compressors in the basement. The larger one is Type ES-1 1948. The smaller is a stand-by unit, Type 40. They supply all the air for the entire plant. There are no columns to obstruct free movement of busses in getting over the pits and out again after service. The roof is supported by six rigid concrete arches 153 feet long and spaced 56 feet apart. These structural members are of special interest to architects, being only 18 in. deep at their apex.

The big floor is quite a sight when all 26 pits are filled, yet one notes how quietly and smoothly the jobs are going on with no confusion. Walking down the line of busses over the pits we see diesel engines being taken out, replaced, tested and one or two men on each are performing practically every check and service job encountered in bus service. We even find a pair of gas engines that have not yet been replaced by diesels. But the trend to diesels that got into full swing with the end of WW II when diesel engine production could get to manufacturers, has proceeded rapidly until the diesel's place is overshadowing.

Each pit is 33 ft. by 3 ft. on the floor with a depth



The machine shop on the second floor is a model of equipment spaced and lighted for comfort and efficiency. Note air hose supplied by Ingersoll-Rand compressor located in basement. Also note ingersoll and Yale hoists.

of 4 ft. 6 in. to permit men to stand upright instead of having to stoop when under the bus. Each pit has its own carbon monoxide fume collector. Ventillation is by an extensive system of exhausting the air. Gas and water lines are in a continuous space at the front end of the pits with a collection system for crankcase oil that is saved and processed for re-use. Another continuous corridor connecting all the pits runs across the rear of the pits as an "escape corridor."

For the motor that must be dismantled a portable crane is used to lift it from the bus and place it on a fork-lift truck. A freight elevator takes it upstairs to the second floor. The motor is re-assembled after all work necessary to put it in 100% order is completed. It is then tested and sent to the stock-room while a new or overhauled motor is put into the bus. The entire job takes from 2 to 3 hours—an indication of what high efficiency of plant, personnel and teamwork has already been achieved in the Greyhound Center. Besides the 26 busses parked for service work over the pits, there is parking space for another 26 Greyhounds on the opposite side of the big floor. There are four Yale hoists over on this side for such lifting as needed on each. And running all over the room on the ceiling and walls are pipes that carry air power. The service building is located just outside the main entrance and between the street entrance for busses and the big general service floor. It is a 140

ft. by 75 ft. structure where 550 busses a day are washed and cleaned in automatic wash racks as they are fueled, greased and inspected. A parking lot back of this service building will accommodate up to 100 busses at a time.

The Chief Dispatcher is an important post in the Pacific Greyhound system, just as it is in a trans-continental railroad system. A battery of teletype machines here gives this spot a big city newsroom atmosphere that reflects the nerve center of the system. It schedules Greyhounds traveling over the entire West and also handles the shifting of busses from one area to another as necessary.

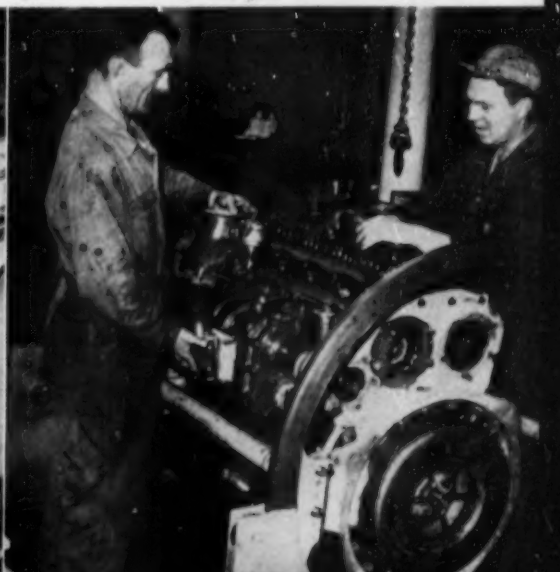
Portland and Los Angeles have other major Greyhound maintenance centers and there are facilities for servicing busses and making minor repairs at 20 lesser points in the seven western states that make up the Pacific Greyhound area. The old Greyhound maintenance center at 17th and Kansas streets has been retained, and is being used for rebuilding and painting busses.

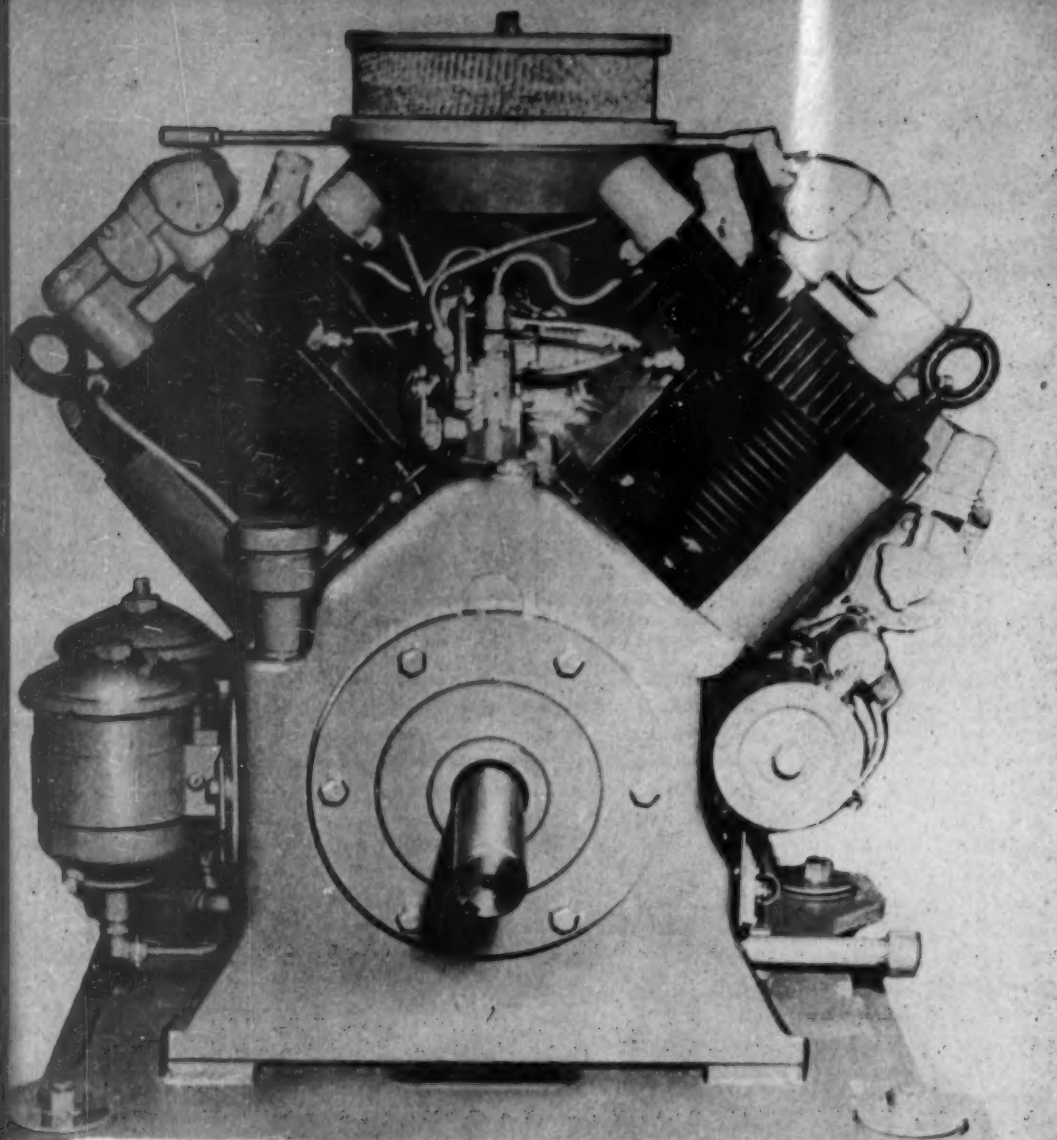
For the present, Pacific Greyhound management believes that it has provided for the immediate and near future in spite of mushrooming populations and new transportation problems arising out of WW II and the post-war era. Problems which center about the increase of population in California, and the general influx of people on the Pacific Coast and in much of the West.

Landis crankshaft grinder working over a pile of crankshafts. Also in this part of the shop are surface grinders and grinders for cylinder liners.

An engine block getting the treatment on a Mattison machine. This machine is located on the second floor of the building.

Team of maintenance specialists working on a GM diesel which has come up from the busses being worked over on the first floor. Note cradle for easy turning of work.





THE NEW HALLETT TWIN

BACK in the October issue of 1952 of *DIESEL PROGRESS*, we ran a detailed description of the Hallett aluminum air-cooled diesel which created a lot of attention at that time. Now we bring you a detailed description of the Hallett Twin, a two cylinder, 85° V-type air-cooled, 4 cycle with integral flywheel blower, rated at 15 bhp. continuous at 1800 rpm. Idle speed, 400 rpm., operating speeds 1200 rpm. to 2200 rpm. and with a bore of 3½ in. and a stroke of 3¾ in. The piston displacement is 36.07 cu. in. per cylinder for a total of 72.157 cu. in. for the engine. Cold compression at 300 rpm., 570 psi.

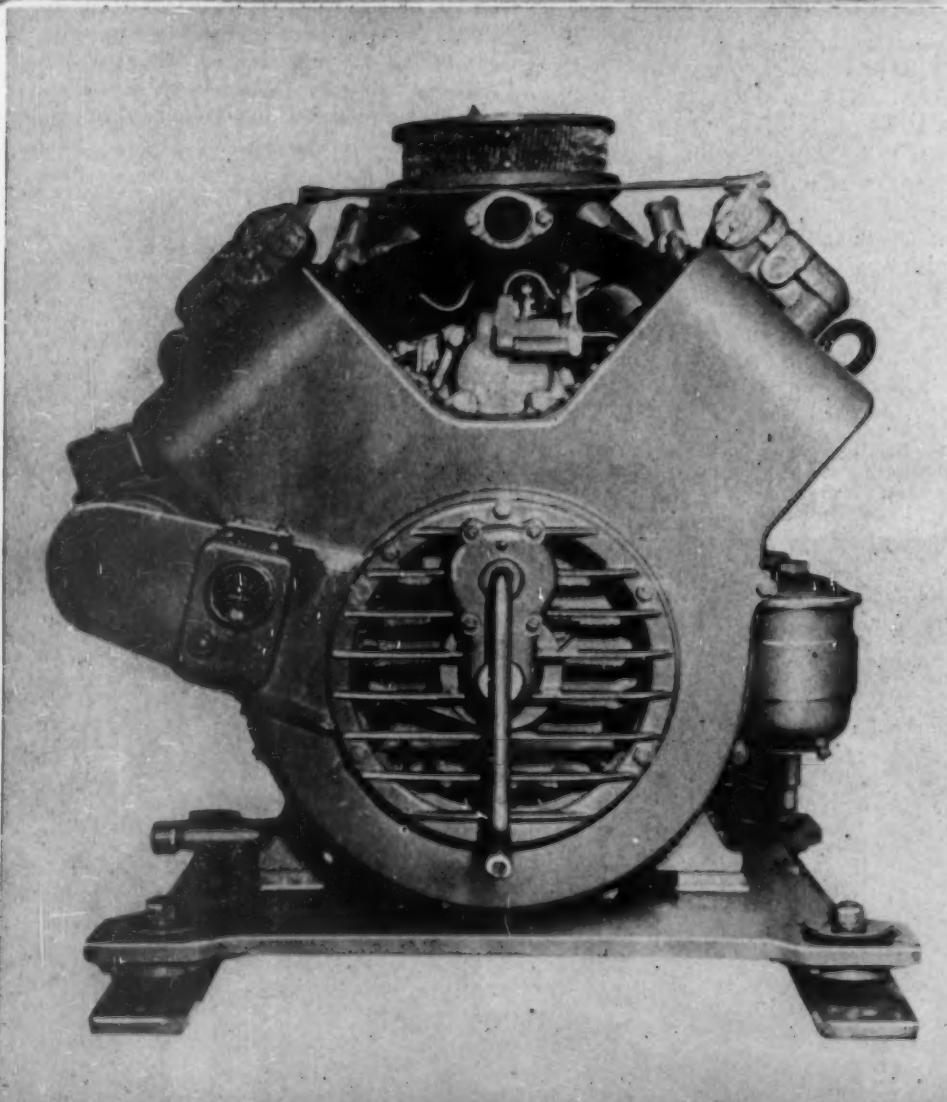
The fuel system is of the Bosch high pressure solid injection with individual injectors and injector pumps, operating from the engine camshaft. The engine comes equipped with AC fuel transfer pump and Purolator cartridge type fuel oil filters.

Any grade of distilled diesel oil or petroleum hydro-carbon having an API gravity of between 26 and 45; cetane No. 36 or better, can be used with this engine. Normal commercial fuels, such as regular diesel fuel, automotive diesel fuel, regular heavy diesel fuel, common kerosene, pearl oil, "Chevro-jet," and JP-4 jet engine fuel may also be used satisfactorily.

The lubrication system is operated with a low pressure gear pump with oil screen, driven from crankshaft gear, fullflow Purolator cartridge type oil filters are used, deluge system to connecting rods and splash to other engine parts; splash feed lubrication to rocker arms and valves through push rod housing. Lube oils which can be dependably used with this engine are U.S. Army Specs. 2-104, B, SAE 30 weight; RPM Delo 30 or equivalent, for normal operating temperature; SAE 10W lubricating oil for operation below 15°F.; crankcase capacity 8 quarts.

The cooling system is by air blast from centrifugal flywheel fan. Flywheel enclosed in cast aluminum directional air shroud with vanes to meter the air to the "hot spots." The crankcase is an all-aluminum alloy casting, having bolted on cast aluminum hand hole cover. Bolted on cast aluminum end bearing plate housing is the Timken main bearing cup. The end bearing plate is interchangeable with end bearing plate adapters for direct connected pumps, generators, gear boxes, clutches, and special mechanisms, as required.

The cylinders are cast individually with integral heads and radiating fins. Casting is of special molybdenum iron. Valve seats and chambers machined in head. Push rod housings are steel tubes



pressed permanently into the cylinder casting, preventing any oil leakage. Intake and exhaust connections are flanged to manifolds. Exhaust manifold outlet is fitted with flanged connection to receive 1-1/4 in. NPT.

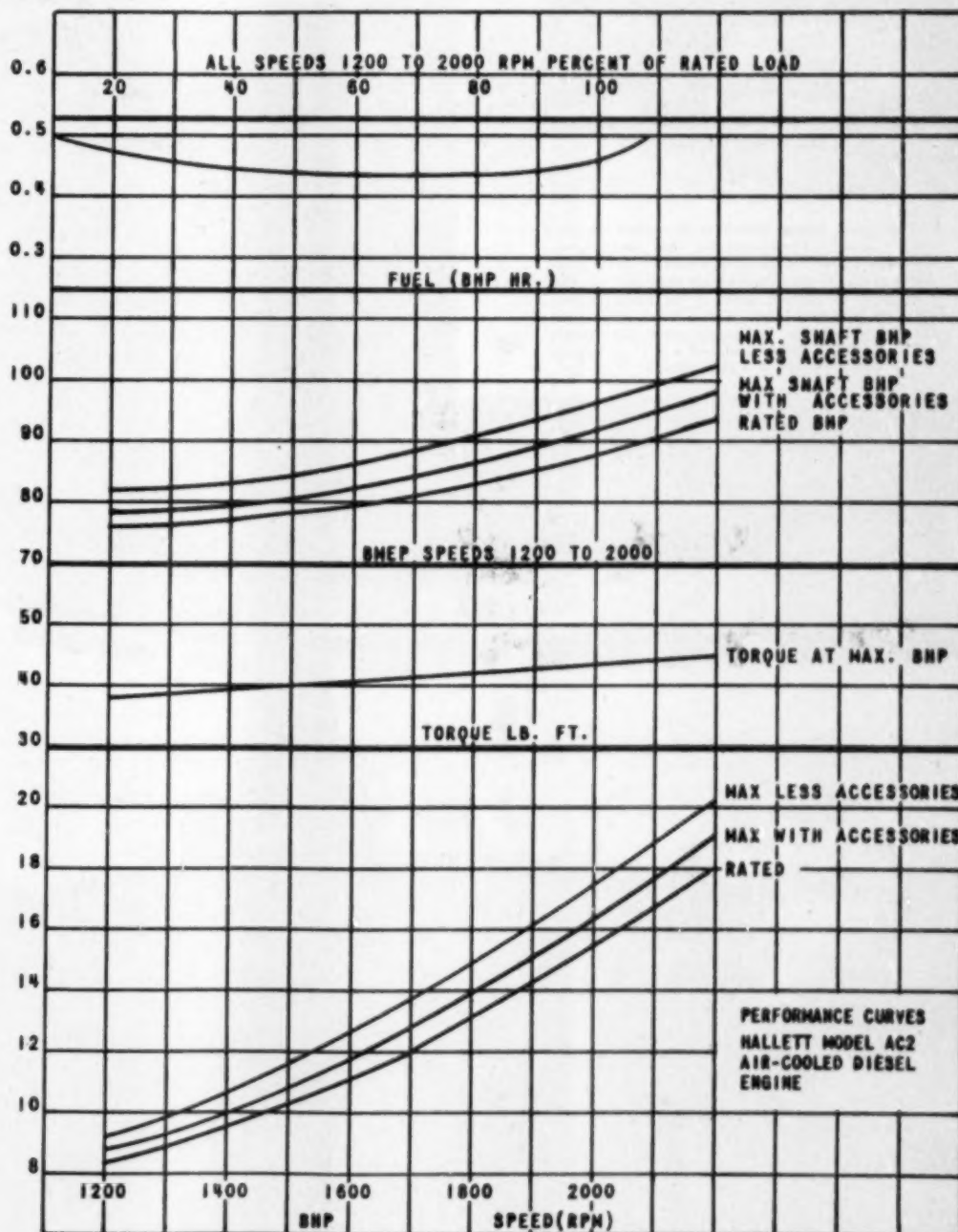
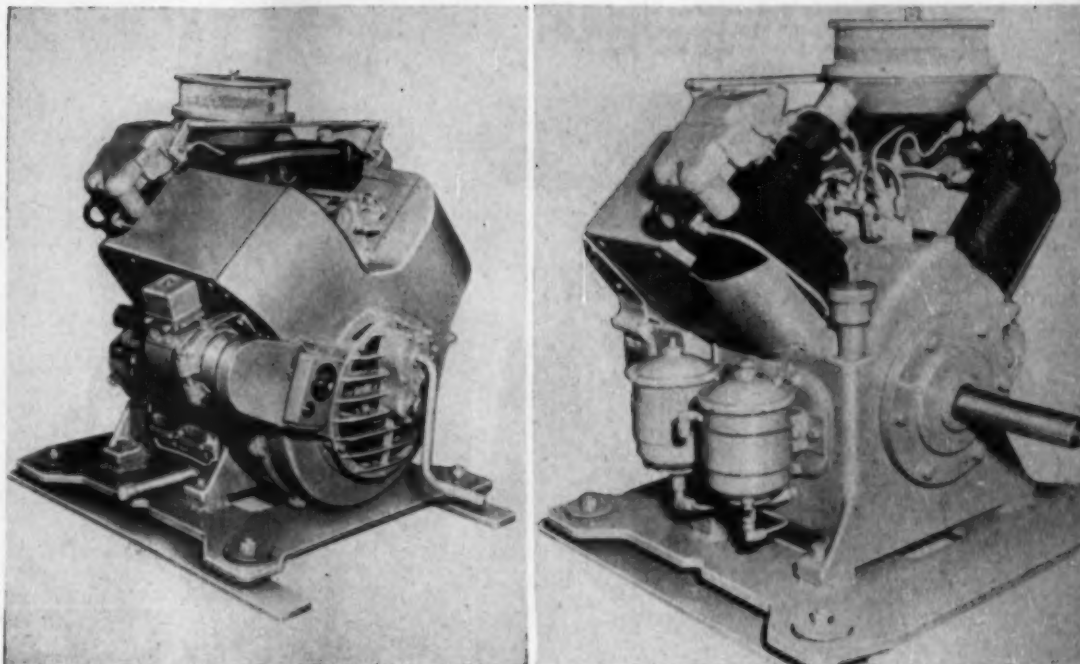
The crankshaft and connecting rod are dropped forged and heat treated SAE No. 4140 molybdenum steel. The two crankshaft main bearings are heavy duty Timken taper rollers 2.5 in. I.D., 5.119 in. O.D. Connecting rod bearing 2.5 in. diameter, 1.5 in. long, fitted with standard Federal Mogul precision type, steel backed, copper lead faced, tin plated split sleeve inserts. Piston pin bearing special bronze, 1 1/8 in. I.D. x 1 1/8 in. long.

The piston is a permanent mold casting, Alcoa aluminum, heat treated with 4 compression rings and one oil scraper ring. The piston pin is hardened and ground, full floating, 1 1/8 in. diameter x 2 31/32 in. long. It is retained by Tru-Arc expansion rings. The camshaft gears are heat treated, cast molybdenum iron, mating with alloy steel crankshaft gear. All gears are shave cut 12 diametrical pitch, 22° pressure angle. The camshaft is hardened and ground steel, running in two bronze bushings in crankcase. The valves are high temperature resistant Silchrome steel with extra heavy stems supported in bronze valve guides. Stems are equipped with safety rings. All moving parts of valve and rocker arm mechanism enclosed in cast aluminum housing and positively oiled. Exhaust valve rocker arm is equipped with compression release mechanism.

The centrifugal type governor is driven from camshaft gear, completely enclosed in crankcase. Mechanical accuracy provides approximately 3% engine regulation over entire engine speed range.

Starting is by mechanical safety hand crank geared 1-to-2, built into air shroud grille. Standard wick holder starting aid in pre-combustion chamber for cold weather starting. Optional electrical system consists of a 12-volt Auto-Lite automotive type starter with positive ground or ungrounded; belt driven battery charging Auto-Lite generator with charging control and reverse current relay; positive ground only. Optional cold weather starting aid, electric intake air heater in manifold, coupled in series with electric glow plug installed in pre-combustion chamber; automatically operated with starting motor contactor.

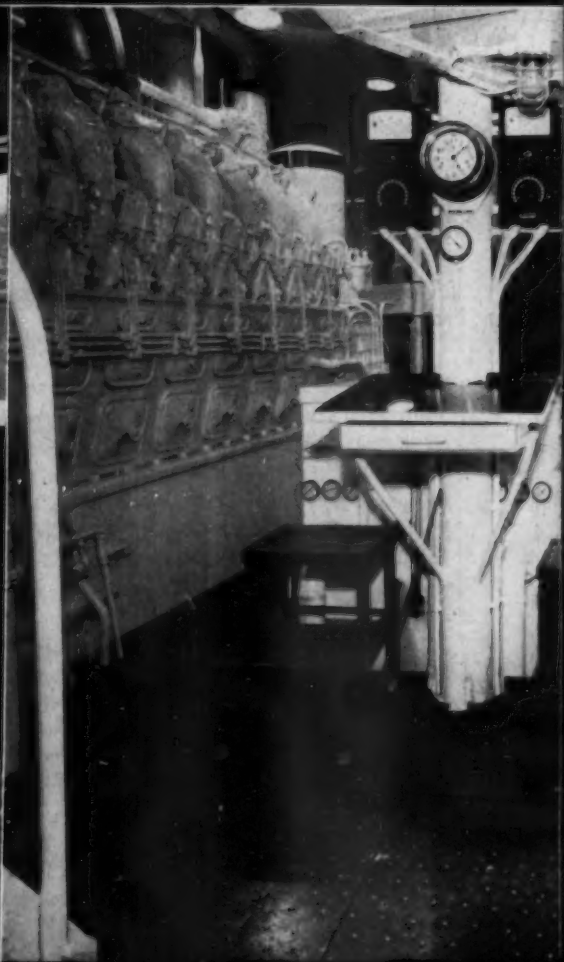
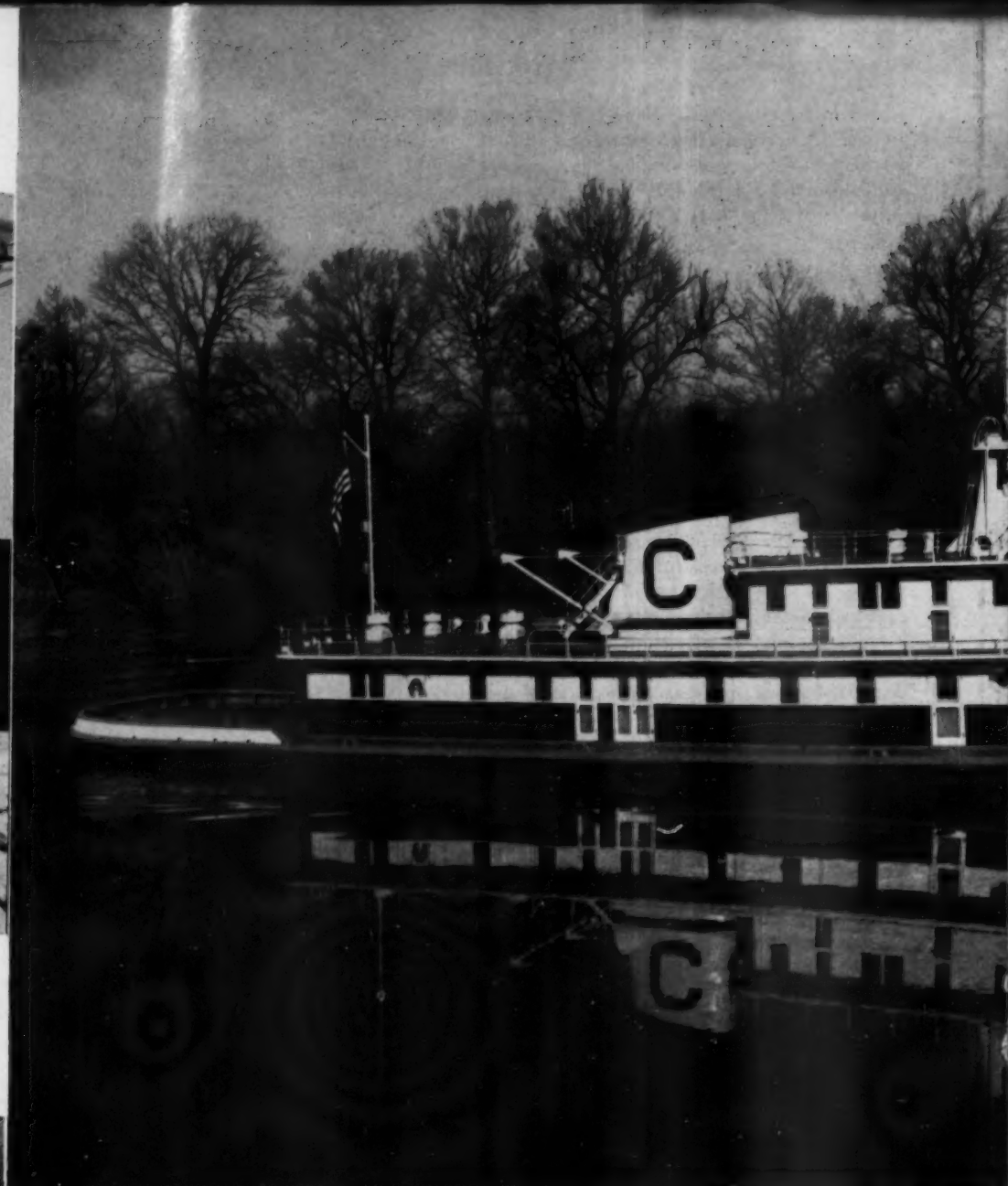
The principal dimensions of this compact Hallett Twin are height 25 in.; length 26 in. Power take-off shaft 1 1/4 in. in diameter; 3/8 in. x 7/8 in. keyway. Hold down bolt hole centers 15 in. wide, 8 3/8 in. long. Engine hold down bolts 3/8 in. Weight complete with intake air filter, fuel oil and lube oil filter is only 350 lbs. The Electric Auto-Lite Company supply the electric starters and generators, Western Gear Works supply the gears, American Bosch the injection equipment; Thompson Products the valves, Air-Maze the air intake and American Hammered the special piston rings. This is a slick little engine which will find a thousand and one uses in this diesel industry of ours.



The chistening crew consisting of Captain Scott Chotin, Mrs. Joseph Chotin, Captain Jos. Chotin and Mrs. Scott Chotin.



The pilot house which is described in the text is well illustrated by this fine photograph. Plenty of room to operate, every modern piece of equipment now available on the market. At bottom right is the main engine room with the two 1640 Cleveland diesels with Marquette governors and the Briggs filters in the foreground and a pair of Bristol pyrometers above them. ➡



NEW TUG FOR JOS. CHOTIN

The Fifth Boat To Be Constructed For This Famous River Organization Is The Largest And Most Powerful Of Their Fleet

By DOUGLAS SHEARING

THE Nashville Bridge Company, Nashville, Tenn., on February 12 last delivered to the Chotin family the fifth boat to be constructed by them for this famous River Organization. The latest edition is the *Jos. Chotin*, and is the largest in size and develops the greatest hp. of any boat in their fleet. The earlier Chotins are the *Irene Chotin*, the *Scott Chotin*, the *Patsy Chotin* and the *Harry Dyer* (named after the president of the Nashville Bridge Company.)

This latest boat off the Nashville ways, whose keel was laid on May 14, 1952, has molded dimensions of 132 ft. x 30 ft. x 10 ft. 6 in. The main engines are a pair of GM 16-278A out of the Cleveland Diesel Shops, each developing 1640 hp. at 750 rpm., and each turning three blade Coolidge Atlantic type steel propellers, 82 ft. x 72 ft. The auxiliary generating plant consists of a pair of GM Model 6-71, 60 kw. generating sets out of the Detroit Diesel Shops. A pair of Gardner-Denver air compressors with Century motors supply the sizeable amount of air required on a big ship of this type. A Blackmer fuel transfer pump, a Briggs fuel oil filter and a Pelham switchboard go to make up the very efficient auxiliary equipment. It might be added that the two main Cleveland Diesel 16 cylinder engines have their shafts turning in SKF spherical roller bearings and Cutless rubber bearings. Two large capacity (ILG) centrifugal vent supply fans and a pair of large DeBothezat vent exhaust fans in the stacks keep the engine room and the living quarters comfortable.

In the pilot house, the equipment consists of a modern pilot's console, and RCA ship-to-shore telephone, a Bell Telephone Company radiotelephone, Sperry radar and the Sperry "Pilot." The purpose of the Sperry "Lever Pilot" on a river boat, which device was previously known as a heading holder and has been installed for the first time by the Chotins on one of their boats, is to hold the towboat and its fleet on any straight, predetermined course. It is used in connection with the radar. As the rotation speed of the sweep line on the radarscope is 15 rpm., 4 seconds per sweep are required. During this interval, the tow could swing through quite an arc and could build up momentum requiring large applications of rudder to return the tow to its original heading. When in the automatic position of operating, the Lever Pilot detects even incremental course changes and automatically applies corrective rudder, thus holding the tow on course.

During clear daylight operation, the use of the Pilot permits only the minimum number of rudder applications required to keep the tow on heading. This, of course, prevents oversteering and overshooting; and thereby eliminates waste of forward thrust. Each time the rudder is applied a certain component of the forward thrust is used to swing the boat and tow back to a predetermined heading.

If this number of applications can be reduced to a minimum, efficient steering is obtained. When the control lever is in the bottom position of the horizontal "H", the pilot acts as a full follow-up conventional lever. Power for the rudders is supplied by a pair of Ingersoll-Rand air motors.

Miscellaneous items of interior equipment on this new vessel consist of a hot water heating system employing a Severn boiler and Arco radiators; a 15-gallon Wagner electric water heater for portable water system for the galley sink and a larger A. L. Smith Corporation electric water heater for wash water. For the convenience of the crew, two Westinghouse Electric water coolers, one in the lounge and one in the dining room are supplied.

Miscellaneous exterior equipment includes a pair of Carlisle & Finch 19 ft. arc searchlights, whose power is supplied by General Electric selenium rectifiers; a Carlisle & Finch 19 ft. incandescent searchlight; a Kahlenberg Challenger quadruplex air horn; a 10 inch bronze ship's bell; power capstan; a special design rubber towing knees; quick connecting, air-operated Nashville Bridge patented winches. The galley, whose working surfaces are stainless steel, is equipped with a Fowler 25 cu. ft. frozen food cabinet; a Tyler 43 cu. ft. reach-in refrigerator; a Frididaire refrigerator in the dining room; and a Hotpoint electric galley range. Total berth capacity is 20, which includes the two provided for in the guest stateroom on the upper deck.

Under her bright new Chotin colors of scarlet and battleship grey, with striking markings of black against a glistening white background, the *Jos. Chotin* left Nashville on February 12 and worked her way down via the Cumberland, the Ohio, and the Mississippi River to her home port of New Orleans to begin her operation on the great Mississippi River System. Again, the fine combination of the Nashville Bridge Company, the GM Cleveland Division and the Chotins have brought into service a fine example of modern efficient river towing.



MAKING NEW HOMES

By DWIGHT P. ROBISON

A three million cubic yard, earthmoving project has converted the rugged hills above the exclusive Bel Air residential section of Los Angeles into a new and extremely desirable residential area. Known as Bel Air Highlands, the project involved cuts and fills of a size seldom attempted in real estate developments, with the largest single fill in the 850-acre tract amounting to 300,000 cubic yards, with a maximum depth of 42 feet. When earthmoving operations began in 1950, there were no roads other than single-lane fire trails in the area south of Mulholland Drive which follows the crest of the ridges north of Hollywood and Beverly Hills. Contractor E. Steinkamp, Inc., of Los Angeles, the developer of the tract, used International TD-24 crawlers equipped with Bucyrus-Erie bulldozers to pioneer access roads and, wherever possible, these roads were laid out on what would eventually be a permanent street alignment. Pioneering work required the tractors to slice through a ridge composed of shale, sandstone, and fine, sandy soil. All of this work was accomplished without blasting.

Fills were a problem, not only because of the terrain but also because layers and pockets of diatomaceous earth—a water-repellant, siliconized material—made compaction very difficult. The material is so fine and so moisture-resistant that it was almost impossible to get moisture into the particles for compaction purposes. The problem was solved by using 2½-inch quick-coupling pipe and a hose for applying moisture to each fill. On the worst concentrations of diatomaceous earth, a TD-24 was used to pull disk harrows over the material, mixing it with sandy soil. Then, as another TD-24 pulled 40,000-pound sheepsfoot tamping rollers

over the fill, the hose man was on the spot to sprinkle each six-inch layer of fill placed by the tractor-scraper teams. The tractors and tamping rollers then compacted the material. Some compaction was obtained from the rubber tires on the scrapers, and after about eight passes with the sheepsfoot tamping rollers, the job was complete.

Compaction was constantly checked by technicians as the fill was placed, and in every case the new earthwork tested at a higher rate of compaction (90% of optimum density) than the original soil in place.

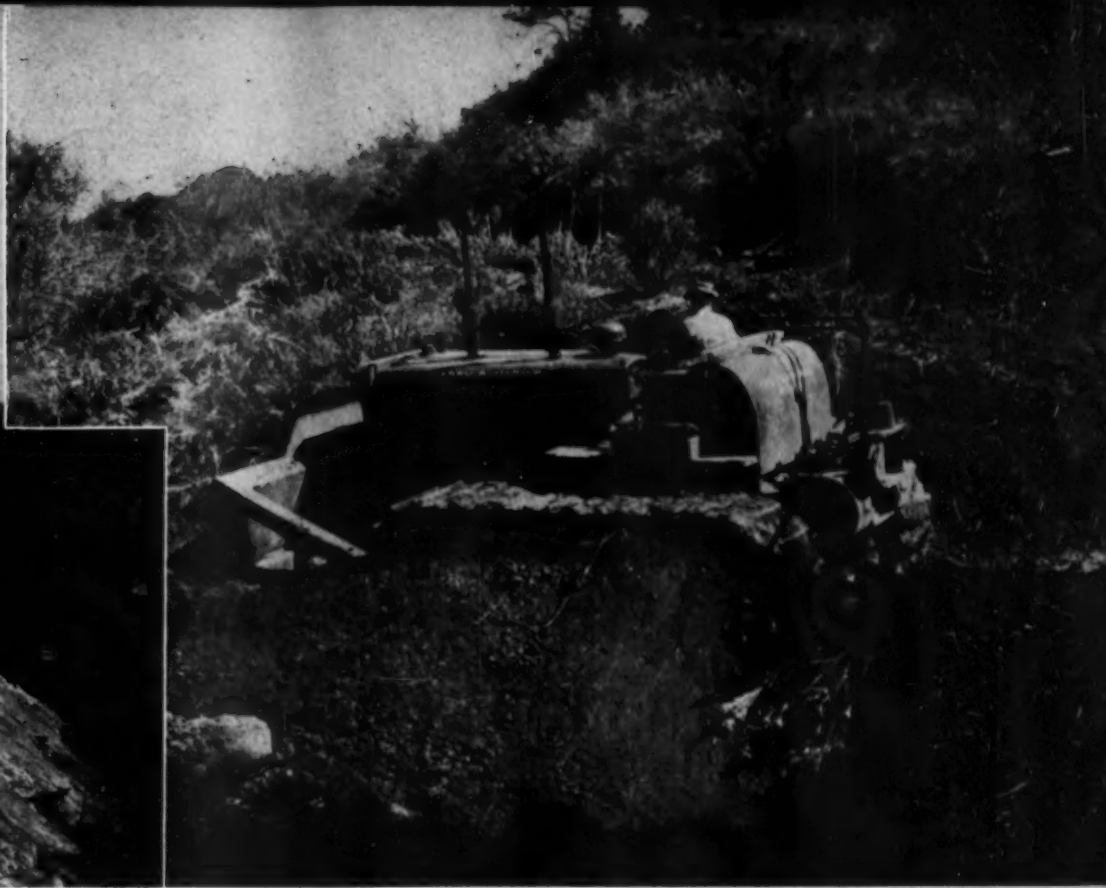
Slopes of the fills were treated to give them resistance to erosion which is severe in this region during bad rainstorms. A ¾ yard Northwest dragline removed the shallow layer of loose earth along the outside slopes, averaging about a foot and a half in depth, and cut the slopes back to solid ground. The slopes were then seeded with California ice-plant or winter rye which require little moisture and which will afford considerable stabilization to the steep fills. City water supply lines were already installed and furnished the necessary water for the plantings. These lines also supplied water for the compaction operations. Steinkamp also provided a cover of good topsoil for the new development. This material was obtained from the canyons running down toward Beverly Hills or the sea which are loaded with topsoil which has eroded from the hills. Roads were cleared into these canyons by TD-24's equipped with Bucyrus-Erie bulldozers, and other tractors with front-end shovels loaded the topsoil into trucks for transport to the new fills.

Big load for a big fill is supplied by tractor-scraper team made up of an International TD-24 crawler and a 21-yard scraper. Largest of the fills required placing 300,000 cubic yards of earth.



Compacting the fills became a major problem but was solved by applying water to each six-inch layer of fill material. Big International TD-24 crawlers pulling 40,000-pound tamping rollers, attained 90% compaction on the project.



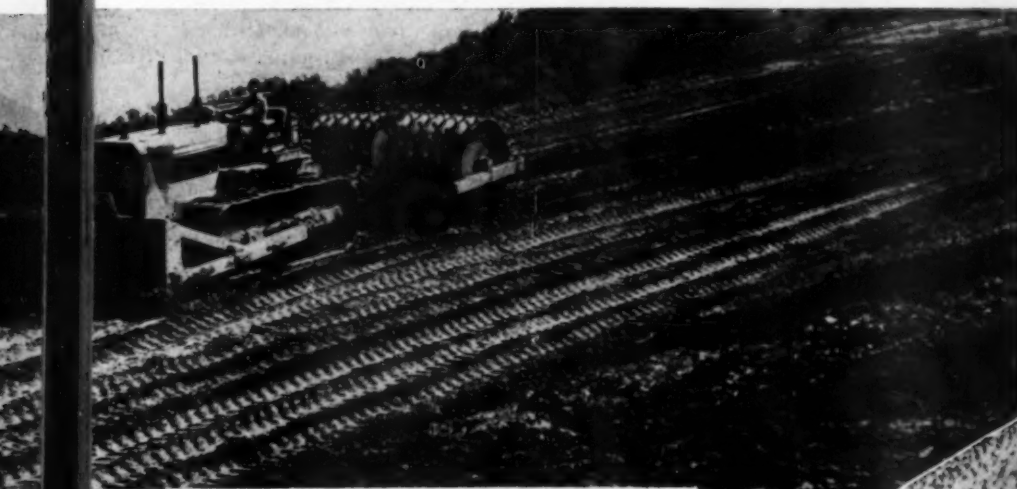


Finishing the fill slopes, a ¾-yard Northwest dragline removed loose earth to a depth of about 18 inches, trimming the slopes down to solid ground.

Erosion protection was furnished by systematic planting of California ice-plant or winter rye which require little water and furnish good stabilization of the soil.

Initial grading for the Bel Air High-lands development began in the tangled growth of the gullies. Here, an International TD-24 crawler tractor, equipped with a Bucyrus-Erie bulldozer, pioneers a road into the new development.

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BUDD DIESEL RAIL CARS SHOW RAPID GAINS

UNTIL the ingenious Budd Mfg. Co. of Philadelphia produced the first successful modern version of a completely self-contained Diesel railroad car, America lagged far behind Europe in the whole process of winning back traffic to the railroads and chopping expenses on vital "must" railroad services that produced nothing but red ink with conventional locomotive and trailing coach equipment.

In Western Europe where lack of modern highways, high density of population and lack of purchasing power has tended to keep people more attuned to mass-travel on railroads than in the USA or Canada. There are now over \$5,000 self-propelled railcars of every description, ranging from small lightweight units not much bigger than a bus, to 6 and 8 car diesel units with 3 classes of passenger accommodation. Europe, with its concentration of heavy population centers, low purchasing power and shorter average runs and inbred traditional complexities of economic and social behavior patterns, has evolved a 3-class system of train fares and equipment, far more defined than anywhere else. Its major railroad systems are going in heavily for electrification and high-powered diesel propulsion for the long hauls and intense and widespread interest in research and production of self-propelled railcars is underway in France, Italy, Austria, Eire, Holland, Norway, Germany, Denmark and other areas, with France and Italy leading the way.

Sum total object is to cut operating costs, increase frequency and speed of service without increasing total expenses and make railway travel so fast, attractive and cheap it will directly compete with highway and air. As pointed out by Stanley Berge in his new study of the subject, "Self-Propelled Diesel Cars and Multiple-Unit Trains," this complex European development that is so far ahead of America points to the conclusion that runs that can carry average loads of 100 on runs up to 100 miles, the self propelled multiple unit railcar can earn far greater profits or reduce far more proportionately inescapable losses, toward zero, or even convert red ink marginal runs to black ink profit runs.

The defeatist attitude held by most American rail systems toward short or medium haul passenger mail and express operations for the past 25 years can be best illustrated by the cold fact that the failure of early distillate burning railcars left such a bad taste by their slow speed, uninviting appeal to passengers, frequent mechanical breakdowns, etc., that today there are fewer than 300 operated around the U.S.A. The whole idea died simply because American railcars were merely shortened versions of the most unpopular part of railroading—the branchline jerkwater locals that helped mightily to turn the public to short, fast, cheap bus travel which, in many cases, took the mail sacks along, too. They carried an originally bad rail operation down to worse, and finally, in most cases, to oblivion.

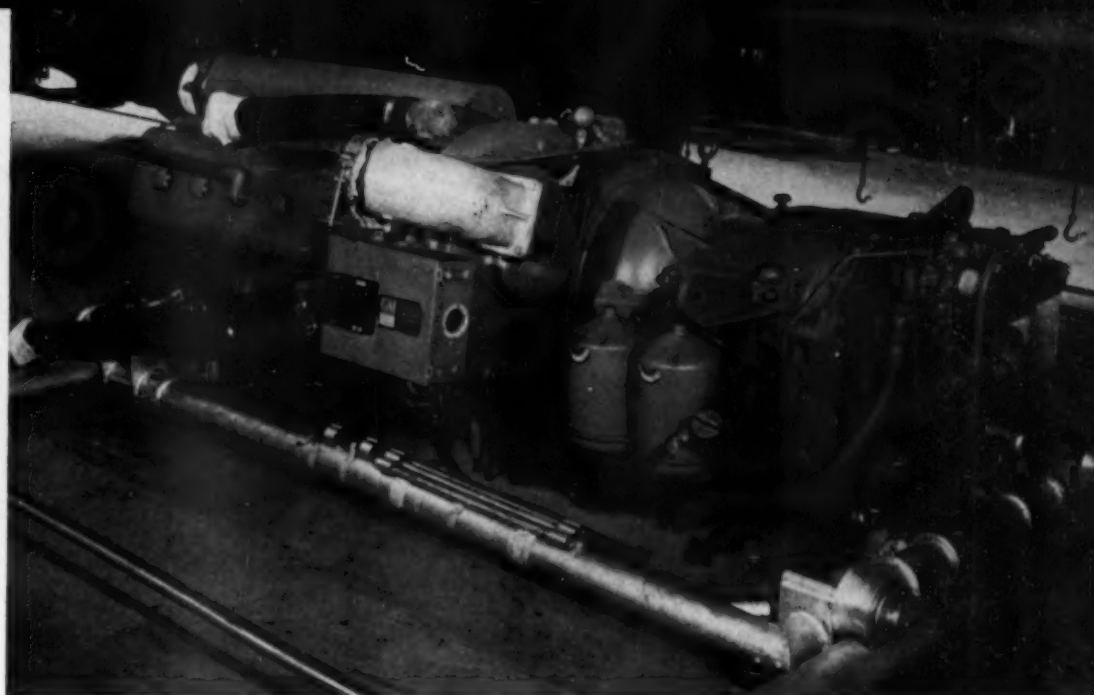
Three-car Chicago and Northwestern
RR commuter RDC's operating as a
single train.

Briefly, the Budd people have created in their RDC railcars a modern, deluxe type of multiple unit subway car suitable for every mile of U. S. and Canadian railroads, either as separate cars that operate like a street car in either direction from either end, or in whole trains. By standardizing on 3 types of 85 ft. passenger cars, altered only by the length of the baggage-mail-express compartments, and a single 73 ft. heavy-duty all-express-baggage mail car unit, Budd brings mass production to a field absolutely neglected since H. L. Hamilton quit building distillate burning railcars and founded Electromotive Corporation, more than 25 years ago.

All the things Budd has pioneered are found in the RDC's:—disc braking for fast, smooth stops with no wheel wear or flat spots; spotwelded stainless steel construction for long-range durability and economical maintenance; novel new approaches to interior layout, lighting, air conditioning and soundproofing. Mechanically, it has adopted the one major type of small diesel power plant that is in widest mass-production for its power range, the Detroit Diesel GM 6-110 engine with cylinders tilted to within 20 degrees of being totally flat, to fit neatly below the floor of the car. And with it the GM's Allison torque converter to permit smooth, rapid acceleration; Frigidaire air conditioning and the automotive-successful Spicer drive. By having twin identical power plants the danger of failure to make schedules is eliminated as a single power unit will bring the car to terminal at better than 65% of scheduled speed.

Thus the whole RDC idea is a beautiful example of a product that can be cheaply mass produced; simply maintained by inexperienced people; sold "off the shelf" from a phone call to the factory, and adaptable enough for the stoppingest local branchline run or the fastest heavily travelled commuter run out of metropolitan terminals. The rugged simplicity of subway cars has been carried into the car heating plant, where automatic thermostatic controls permit use of waste engine heat to keep passengers comfortable; and the auxiliary generators, like on a truck, handle all the electric load automatically.

A railroader's dream, the cars have a very high power to weight ratio that permits acceleration above 1.1 miles per second which automatically permits operation at reduced throttle at normal cruising speeds. The torque converter drive saves cost, weight and bulk. Power application permits truck swing up to 23 degrees, and operation on the sharpest yard curves or switches, safe and easy. The mechanical layout with power plant entirely under the car floor and air intake, exhaust and cooling radiators in a central dome on the roof, gives 100% interior utilization and up to 90 passenger capacity, including toilet space, if needed. Thus a single American company has boldly walked in and within three years completely conquered a railroad field long considered a dead duck. From the time when the first Budd demonstrator car started touring U.S. railroads in the middle of 1949, it proved a sensation. By late 1952 more than 80 were sold to U.S. and foreign railroads, most of them repeat orders from customers who gingerly bought one or two with



The GM Detroit diesel Model 6-110, 275 hp. with Allison torque converter as used in the Budd RDC railcars.

fingers crossed. From the beginning the RDC's went on the toughest, most obnoxious runs, financially and operating wise, in the same strange pattern the first diesel freight locomotives were assigned. The railroads simply dared the Budd cars to make good! Since December, 1952, four of the original customers have ordered 38 more to be delivered in 1953, including a big order for 30 for the New Haven, America's largest passenger carrier (percentage-wise to total annual gross income), where they have proved the most sensational new business getter to ever hit the nation's busiest passenger carrier.

The prime factors on a crowded line like the New Haven show up the inherent characteristics of the Budd cars to great advantage. Acceleration up to 44 miles speed in 60 seconds fully loaded; speeds up to 85 mph. on level grade; 62 mph. on 1% grade; 42 mph. on 2% and 28 mph. on 3% grades make an ideal combination for fast main-line work, then off up a rolling branch. Operating on tight schedules make the normal complete engine changeout of 2 hours flat a perfect answer for morning and evening commuter runs. A trained Budd shop crew has changed out engines in 70 minutes! No pits. No tables. No fancy tools. As of December, 1952, the original RDC demon-

strator car had run nearly 120,000 miles on the nation's major railroads. Ownership is widespread among 11 U.S. and 3 foreign systems as shown by Table A.

The uses by customer railroads and the operating results are as varied and startling as the simplicity, popularity and economy of the whole RDC idea. They were such an instant and astounding success on the New Haven, that by the end of 1953 there will be 45 RDC's in service on that one road. Branches that have not seen a passenger train for 25 years now show a profit from the day RDC's started service on their "Shoreliner" fleet as they are all termed on the New Haven. The Company, by deftly getting back travel from the buses, showed a gain of 1¼ million commuters in 6 months, and passenger revenues reached 41% of the New Haven's gross income! By the end of March, the New Haven had 40 "Shoreliners" in operation, which will release 16 diesel locomotives, 3 gas railcars, 46 coaches, 9 mail cars, 9 baggage cars, the 3-car Comet streamliner and another 3-car articulated train. The Company figures 1,925,000 miles of passenger service per year is a potential or actual Shoreliner operation with RDC's. Already 52.9% of this mileage is RDC operated. Statistics show on the New Haven that

The entire fleet of 12 RDC's on the Pennsylvania-Reading Seashore Lines. They are hooked together as one train and are split up into 2-car trains along separate routes.





Changing the engines on an RDC. Normal change can be made in two hours without pits or complicated tools.

operating costs have been cut 50%. When the Fall timetable came out the New Haven showed fifty new schedules due to the RDC Shoreliner cars making runs that did not exist before possible, or former dead loss runs profitable! Thrifty New Englanders are leaving their cars at home and leaving the buses and the crowded highways, in droves. A large percentage are women travellers on mid-day runs that heretofore never thought of using a railroad.

The New York Central's "Beeliner" fleet of 15 trains generally follows the same pattern in heavily populated or suburban type zone operation. Contrasting this is the 924 mile Oakland-Salt Lake City run on the Western Pacific, three round trips per week by two cars, to reduce a strictly red ink operation in the high, dry lonely Nevada-Utah desert country and in the sand-clogged Saudi Arabian run between Dammam to Riyadh, 352 miles. The New York Central shows savings on displacing 5 steam passenger trains with RDC cars of \$218,683 every three months. Twelve

Pennsylvania-Reading Seashore lines RDC's, operating in a fan-wise cycle, starting at Camden as a 6 car train and winding up at Wildwood, Cape May and Ocean City as three 2-car trains, chopped operating costs so this white elephant line now almost runs in the black. It is one of America's most profitless passenger lines, that cost \$2,475 per train mile with steam trains, reduced to .708 per car mile with RDC's, and 100% availability.

No contrast-picture of the RDC landslide is complete without a look at what the Santa Fe has done. The Santa Fe has long been Budd's biggest passenger car customer, having been the first U.S. railroad to break away from the Pullman-built sleeping car monopoly. Faced with some of the toughest highway and airline competition on the continent on its 129 mile Los Angeles-San Diego line, Santa Fe has long operated the popular San Diegan streamliners, notable Budd-built trains of diesel and stainless steel. Last May they added a 2-car RDC train on two round trips per



The Western Pacific's RDC "Zephyrette" on its 925 mile Salt Lake City to Oakland run. Two of these cars maintain regular schedules between those cities.

TABLE A

The following table shows the delivery of Budd RDC's to March 15th. Acceptance of the cars is international with deliveries being made as far away as Australia and Saudi Arabia.

RDC DELIVERIES TO MARCH 15, 1953

Railroad	RDC Type				Total
	1	2	3	4	
Boston & Maine.....	4	..	2	..	6
Baltimore & Ohio.....	5	..	..	..	5
Chicago & Northwestern.....	2	1	..	..	3
Commonwealth Railways of Australia.....	3	..	..	..	3
Consolidated Railroads of Cuba.....	11	5	..	..	16
Duluth, Missabe & Iron Range Railway.....	..	..	1	..	1
Lehigh Valley	1	1	..	..	2
New York Central.....	16	1	3	..	20
New York, New Haven & Hartford.....	29	2	6	3	40
New York, Susquehanna & Western.....	4	..	..	..	4
Pennsylvania-Reading Seashore Lines.....	12	..	..	..	12
Santa Fe	2	..	..	..	2
Saudi-Arabian Railway .....	..	3	..	..	3
Western Pacific .....	..	2	..	..	2
					119



One of Pennsylvania-Reading Seashore Lines RR RDC's at a passenger stop along its route.



Below, Top: Two-car RDC train on the Lehigh Valley Railroad. Bottom: Santa Fe's recently acquired RDC's which provide fast 2¼ hour service between Los Angeles and San Diego.



day, frankly an experimental run to study possible future applications at other points on their big network. The big interest is the non-stop commuter run which leaves San Diego at 7:15 A.M. and gets to Los Angeles in 2 hrs. and 15 min., remarkable considering grade crossings, the big hill outside San Diego and the Los Angeles terminal congestion. In spite of an average passenger fare of only 1.82 cents per mile, the train is earning 41 cents per mile operating profit on two daily round trips! The second round trip is slower, with 3 regular and 6 flag stops. The Commuter RDC leaves Los Angeles at 4:20 P.M. daily, so a San Diegan can put in a full business day and be home for dinner.

It is increasingly obvious that as the nation's highways grow more congested and the population spreads in ever widening circles, whole new areas of cheap, fast passenger transportation are again opening up to the railroads. Spearheading the back to the rails trend now developing, and the long-last realization by the public that fares have got to produce a net gain for the railroads, instead of a charitable contribution required by law to some nasty old railroad they are forced to ride on, the RDC idea obviously is more than another new piece of equipment. It is a whole new concept of railroad travel and operation at the exact opposite scale of the 18 car deluxe, once a day super streamliners and the 125 car transcontinental diesel freight train. It is the happy gadfly that caters to the whims of passengers, mail and express. Most of the mail now being diverted to trucks can go back to the rails if five daily RDC schedules are run instead of one or two slow steam trains.

Costing about \$180,000 each, delivered, the RDC is now piling up, as a combined fleet, over 500,000 miles per day. Ducking around and by, the heavy trains, it fits into CTC operation perfectly, on single track lines. It can even be neutralized to run as a passenger car in any size standard train, then unhook and run a branch line schedule the rest of the way under its own power! Its potentialities with axle loads of less than 34,000 lbs. on 65 lb. branches that are too light for even a modern diesel locomotive, are startling.

Coverdale and Colpitts issued a statistical cost breakdown on the Budd RDC cars late in October. Briefly, this famed firm found that by impartial

survey, the Budd cars ran from \$1.1498 per mile, including fixed expense (insurance, depreciation, interest, etc.) way down to .5550 per mile, with a single exception. One railroad showed \$2.0263 per mile because it only ran 64 miles; paid a 3-man crew for 11 hours to run the 64 miles and loaded expenses with inspection costs based on time rather than mileage. Fuel consumption averages 21½ miles per gallon for all purposes, including heating, lighting and air conditioning. Repair costs per mile varied from a low of 7.66 cents to 45.90 cents per car mile. Disregarding the 3 highest and the 3 lowest, the remaining 9 systems turned up in the range of 17.01 to 30.44 cents or an average for all 15 systems which includes the highest and the lowest range, of 21.22 cents per mile. For the entire group of participating railroads, operating RDC pools with from 36,000 to 120,000 miles per car per year, the grand total average showed the RDC cars cost .7960 per mile to operate, for everything.

Great hope for the future lies in the train crews consenting to stop loading the cars down with excess manpower. If they'll do that, the total employment for them will double. Fewer men per car will increase total manpower employment as a cold matter of economic fact. Vivid example of this, and one which all U.S. railroads are watching, is actually in process on the New Haven.

It has kept its promise to the Brotherhoods that if the Budd cars will actually bring back traffic to the railroad, once considered lost forever, and they won't make the Budd cars uneconomic to run by loading them with too much manpower, the company will add more cars and more jobs at a far faster ratio than it will if labor costs are going to strangle the otherwise economic operation from the start.

The mechanical side of the Railcar operation has been gloriously fixed by Budd, and it is already a proved success. Now the labor forces and the travelling public hold the key to its success entirely in their hands. For our readers who want to study the whole railcar development in both America and Europe, we suggest you get a copy of Professor Stanley Berge's latest book, by writing him at the Northwestern University School of Commerce, Chicago, Ill., enclosing \$1. His survey brings the whole subject up to date and gives the total world-picture from every angle.

DELANO, MINNESOTA

CIVIL DEFENSE

By T. J. MALONE

WHEN a surprise flood, in April of 1952, threatened to shut down the municipal power plant in Delano, Minnesota, a village of 1400, one lone engine in the battery of five diesels was able to keep going. It saved the situation, meeting all demands for energy through 111 hours of continuous operation. As told by Plant Superintendent Al Weihe, the battle for the plant is quite a story. The Crow River flows right past the plant's

nothing with the exhaust pits. Fortunately, there was one engine with overhead exhaust venting into a silencer high above ground level. The air intake system here is also overhead.

The plant's five engines, all Fairbanks-Morse have a combined capacity of 3740 hp., 2596 kw., and had generated 4,093,000 kw. hr. in 1951. Fortunately, in the emergency, it was the newest and most

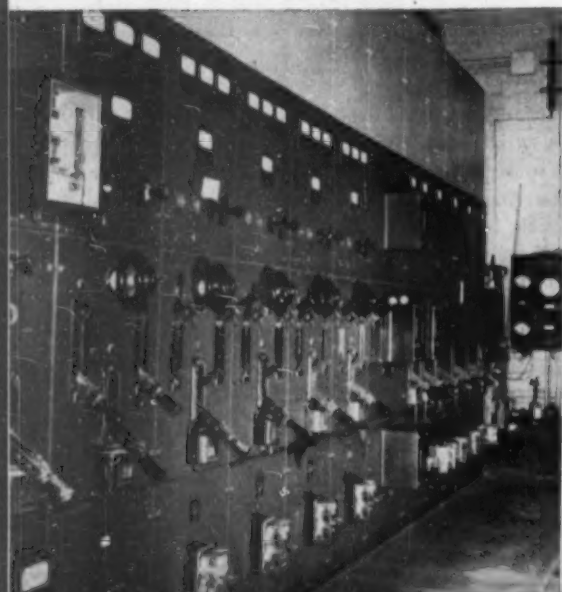
eration only 459 kw. hr. as against the OP's hourly average of 638 kw. hr. in the eight months it had run in 1951. It didn't have to work as hard either. Its running load factor for the four and five-eighth days was 40 percent as compared with 56.2 percent for eight months of 1951. Sandbagging? Half a hundred men and boys in Delano groan today when they think of it. Some of them worked on pay — police, fire department men, the plant crew — but the rest were volunteers for the cause. Men worked day and night. Some snatched a few hours of sleep, now and then, in the plant building. The plant embankment gave way Saturday night but fast work plugged the break. Community teamwork did it. Delano's first electricity was purchased from a transmission-line utility. The village in-



Height of the flood. The power plant building, original structure and three additions is shown in photo.

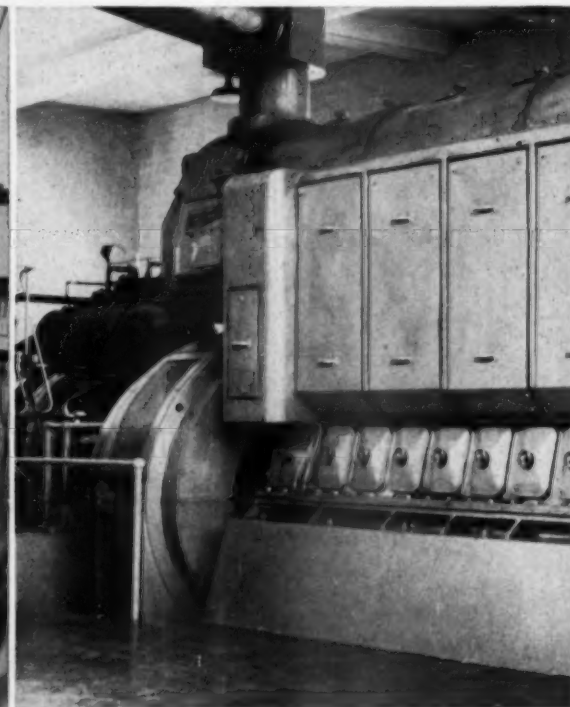
side yard. A small stream known to go nearly dry in summer, and which had never risen so high before, flooded all the downtown section of the village, seeped into the plant basement, filled the pits into which the exhaust pipes from four of the five engines, lead, and put the engines out of business. Emergency pumping safeguarded auxiliary equipment in the basement but could do

The switchboard—14 panels and a double bus installation.



powerful unit that was in a position to run. Installed just a year before, it is a 10-cylinder, 1600-hp. at 720 rpm., 1138 kw. opposed-piston diesel and proceeded to turn out the full plant demand for the period of crisis. It assured to all in Delano, without interruption, the baby's milk, dad's morning toast and coffee, mother's Monday wash and Tuesday's ironing, lighting in home, street and office, power for machines, radio, TV. The plant's peak load in 1951 was 1165 kw. compared with the OP's rated capacity of 1136 kw. Could the OP meet the challenge? There was never any doubt about it, for similar engines have successfully carried emergency overloads in countless marine, rail and stationary installations, in peace and war. What was a little overloading when hundreds of people were counting on this one engine, many of them overloaded too and working day and night in sandbagging that plant building against the swirling menace!

Actually, the diesel was not called on for overload service. With much of the town under water, homes upset, business disorganized, the demand for current was below normal. The peak in the period of one-engine operation was 900 kw., the hourly gen-



The Fairbanks-Morse 10-cylinder, OP diesel that, alone, kept the Delano

stalled the diesel plant in 1931 with three small F-M engines, of two, three and four cylinders. The first engine was retired in 1951 when the opposed-piston unit went in. The compact new engine, though far more powerful, was erected on the foundation of the old one. A 6-cylinder, 450-hp. unit was added in 1939 and a 6-cylinder, 1200-hp. in 1946. The rated kw. capacities of the five engines run: 136 — 184 — 300 — 840 — 1136.

Replacement of the smallest engine by the largest raised the plant's net capacity by 1048 kw. without any expansion of the building. Against the new capacity of 2596 kw., the 1951 peak indicated a plant reserve of more than 100 percent. Gross production in 1940, 1,321,600 kw. hr., was at an average of 10.96 kw. hr. to a gallon of fuel oil. The fuel cost per kw. hr. of generation that year was 5.93 mills. (Those were the days!) In 1951, engine efficiency was much improved but higher fuel cost pushed the average per kw. hr. to 8.9 mills. The plant is using a light crude oil for which it was paying, in July, 1952, 10.7 cents a gallon, and finds it quite satisfactory. The only treatment of the crude is to pass it through a Sentinel filter. In the five years, 1947-1951, generation rose from

2,825,000 to 4,093,900 kw. hr., average number of kw. hr. per gallon of fuel oil from 11.88 to 12.69. Of 1951's gross generation, 3,371,929 kw. hr. were sold to consumers, through 861 meters. The breakdown by kw. hr. was: residential, 802,980; commercial light, 285,845; power, 1,604,546; water heaters, 678,578.

A granite works, the leading industry, uses most of the industrial power sold, a total of 1,279,858 kw. hr. in 1951. The rest goes to 45 other customers, including a creamery, two feed mills, a printing company and a locker plant. The large consumption of the granite works and the nature of its load present an unusual problem to the municipal power plant. Processing granite is a tough job. It

diesel period began with a distribution system having a book value of \$12,000 and with a cash surplus of \$3,000, and no debt. Valuation of the electric plant, operated on a pay-as-you-earn basis, on December 31, 1951, was \$500,079, without depreciation. This was overall, embracing land, building, light and heavy machinery, other equipment and distribution system. A total of \$477,448 in revenue bonds had been issued in the twenty years of operation. Plant earnings had retired \$262,448 and there were \$215,000 outstanding. The 1951 annual statement declared that the total value of services furnished free since the plant was in operation came to \$70,427. The services included street and other lighting, and water used for fires, skating rink, flushing hydrants, leaks and losses. Total

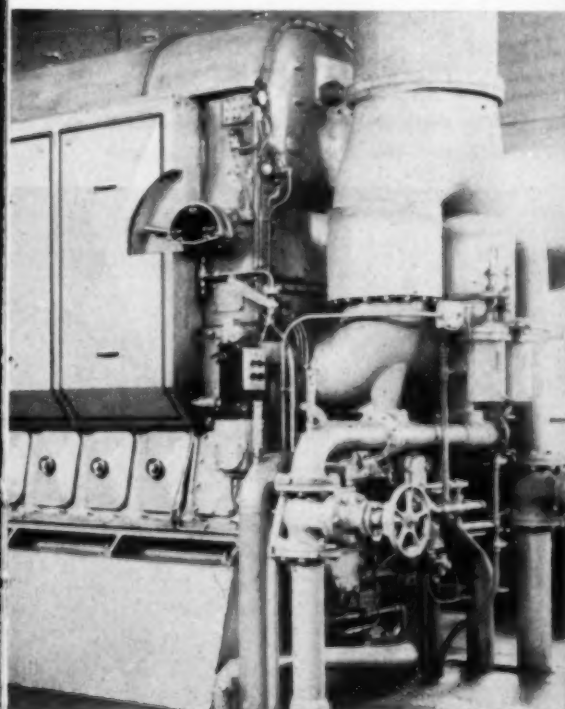
List of Equipment

Engines—One 1600-hp., 10-cylinder, 2-cycle, 720 rpm. Model 38D8 opposed-piston diesel. One 1200-hp., 6-cylinder, 2-cycle, 300 rpm. Model 33F16 diesel. One 450-hp., 6-cylinder, 2-cycle, 300 rpm. Model 32E diesel. One 280-hp., 4-cylinder, 2-cycle, 300 rpm. Model 32D14 diesel. One 210-hp., 3-cylinder, 2-cycle, 300 rpm. Model 32D14. All Fairbanks, Morse & Co.

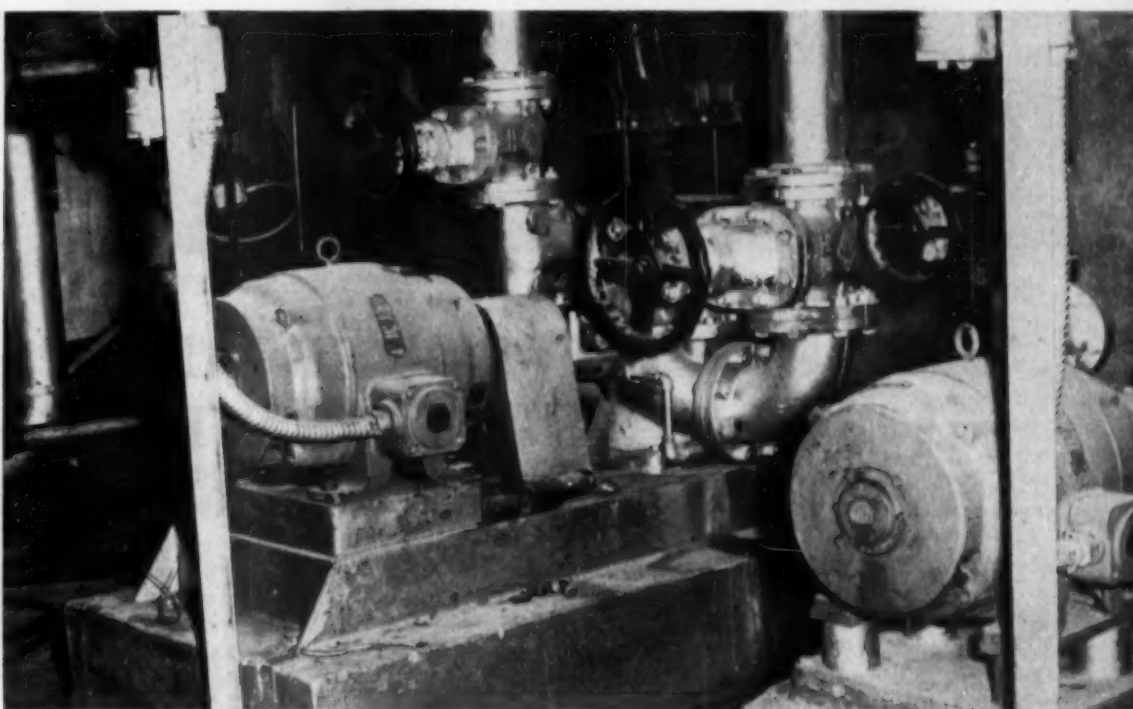
Alternators—One 1136-kw. with 10-kw. belted exciter. One 840-kw. with 15-kw. belted exciter. One 300-kw. with 10-kw. belted exciter. One 184-kw. with 7½-kw. belted exciter. One 136-kw. with 7½-kw. belted exciter. All Fairbanks, Morse.

Governors—Woodward.

Fuel oil filter—Sentinel.



municipal plant operating when the flood hit.



View of the two Fairbanks-Morse circulating pumps which are installed in the Delano Municipal power generating plant.

calls for high power and entails sudden and extreme changes of load. The granite plant has a 300-hp. motor, several motors of 100 hp. and a number of fifties. The uneven load keeps the municipal plant's running load factor low. The better to serve this unique demand, the switchboard at the municipal plant has a double bus installation, a power bus and a regular municipal bus, so that any unit of the plant may be used on either bus independently. Performance of each engine in the year 1951 is shown in the following summary. The 1600-hp. unit was in service for eight months, May-December:

Unit	Running load factor %	Kw. hr.	Hours Operated	Kw. hr. per gal.
*1600 hp.	56.2	1,541,600	2416	13.35
210 hp.	57.3	228,200	2948	11.11
280 hp.	74.7	271,100	1982	12.94
450 hp.	53.2	617,200	3893	11.77
1200 hp.	53.7	1,434,200	3199	12.67

Totals..... 4,093,900 12.69

* This engine went into service in May, 1951.

How has the municipal plant done financially? The

sales in 1951 were given as \$96,984 and operating profit, before depreciation, as \$33,399. Net profit, after depreciation of \$15,036 and other adjustments, was \$17,129.96. A commission of three members operates the electric plant and the water department. Harry Kuka and C. N. Lundsten have served since 1938. L. J. Rieder is the third member. Alvin C. Weihe has been with the plant from the beginning and its superintendent since 1934.

Though the flood experience cost the municipal plant some thousands of dollars in physical damage, there was a profit side to it all. Many a community finds itself only when under stress. People get better acquainted in meeting a common problem; gain a clearer sense of values. Most Delano citizens had probably taken the municipal plant for granted, not seeing it as the central and key industry of the community. The threat to the plant jolted them into realization of how much their daily lives—their comforts and necessities—depended on it. How many families had any home standbys on hand against failure of electric service—an oil lamp or a candle, a wood or an oil stove? One never misses electric current until its source is threatened. Now, how they love the power plant.

Air filters—American Air Filter.

Fuel oil meters—Pittsburgh Equitable Meter.

Lubricating oil—Standard Oil Company, Indiana.

Lube reclaimers—Briggs and Hilliard.

Lube oil cooler—Ross.

Cooling towers—Two. Diesel Service Co.

Snubbers—Burgess-Manning.

Pyrometers—Alnor.

A 20-hp. F-M pump in the water department at Delano.





22-ton rear dump Euclids operating in the Iron Range of Minnesota. They are powered by 240 hp. Buda diesels.

TORQUE CONVERTER AND TRANSMISSION DRIVE IN OFF-HIGHWAY TRUCKS

By ALAN S. McCLIMON*

SEVEN years ago Euclid pioneered the application of torque converters to heavy duty, off-the-highway earthmoving operations. Today there can be no doubt that the converter driven earthmover has established its "place in the sun." These brief but revealing seven years have spotlighted the advantages to be gained. They have more clearly brought into focus the role the torque converter driven unit is destined to play in future operations and to point the way towards those specific applications where it is best suited.

During the past year the acceptance of the torque converter moved ahead by leaps and bounds. In the Minnesota Iron Range, where some 1,300 large off-the-highway trucks are operating, there were only 45 torque driven trucks as of May, 1951. Yet, during 1952, almost 200 converter equipped trucks of all makes and sizes were placed in service. In the copper mining area of the Southwest, there are now 76 units or about one third of the 173 trucks operating in 10 major mines. Approximately 20% of all Euclids built during 1952 were converter equipped. The figure doubtlessly will increase for 1953. During 1952, the 22-ton torque converter driven rear-dump truck lead the field for torque equipped units shipped, accounting for approximately 42% of shipments in this size. It has a 300 hp. Cummins engine with Allison 600 series torque converter

and 600 series torqmatic transmission. This year it will also be offered with a 275 hp. GM engine.

Compared with the same truck equipped with a standard 10 speed transmission, the Cummins 22-ton torque converter truck selling for \$32,550, costs \$2,420 more or about 8%. On a write-off period of 15,000 hours, the higher original investment amounts to 16 cents per hour. To this five cents should be added for interest and other higher fixed charges and an average of fourteen cents for added fuel consumption which is 10 to 25% higher. Converter make-up oil adds another ten cents per hour. These added costs total \$.45 per hour of operation, exclusive of any maintenance differences between the converter and mechanical transmission systems. On those specific hauls where the converter "fits," these costs are readily outweighed by the increased production achieved. But even on hauls where there is no productive gain, converters have been applied, and found to have other benefits and advantages. Several such applications are found in the midwest bituminous coal fields where they are used on fairly level hauls of 3 to 4 miles.

A Mesabi Iron Range installation provides the following comparison of converter and transmission equipped operation on 2200 ft. of 8% grade. Two trucks were equipped with 300 hp. Cummins engines. Schneider 17-in. converters and 5-speed transmissions. Two similar units had a conventional clutch and 5-speed transmission. Production cycle times were as follows:

	Torque Converter	Transmission
Load	2.56 Min.	2.56 Min.
Haul, total		
2400 ft.	4.53 Av. 6 mph.	4.98 Av. 5.5 mph.
Dump	1.00	.90
Return		
Empty	2.4 Av. 11.4 mph.	2.67 Av. 10 mph.
Delay	1.72	1.72
Total Cycle		
Time	12.21 Min.	12.83 Min.
Trips per		
50 Min. Hr.	4.1	3.9
Tons per		
Hour	90	86
Fuel cons.,		
avg.	5 Gal. per Hour	4 Gal. per Hour
Gals. of fuel		
per trip	1.2	1.03

On this job study, the converter unit shows 5% more tons hauled. Note the average haul speeds of



Twin-power scraper driven by two 190 hp. GM Detroit Diesel engines on a highway job in North Carolina.

6 mph. versus 5.5 mph. loaded. This is typical of the increased performance on haul roads having variable road rolling resistance and grades. The converter automatically adjusts torque output and speed to meet operating requirements. Other installations have resulted in 10% to 15% production increases.

Inherent in the problem of operating over variable grades is the human element. Drivers have a difficult time keeping a conventional transmission in its most effective operating gear range throughout the day. An example is found in a copper ore stripping operation in Arizona. A record was kept of gear shifting a 22-ton truck with transmission, and a converter equipped 34-ton truck. Transmission shift comparison: 22 ton truck with 5-speed mechanical transmission; 34 ton truck, twin power, with converters and torqmatic transmission:

	Number of Gear Shifts Performed	
	22-Ton Truck	34-Ton Truck
533 Ft. of 7.8% Grade	5	1
555 Ft. of 9.7% Grade	6	1

*Mgt., Sales Development, The Euclid Road Machinery Company, Cleveland 17, Ohio.

2640 Ft. of 9.7% Grade	4	1
1320 Ft. of 3.6% Grade	1	1
2112 Ft. of 3.0% Grade	0	2 (Upshift)
Total number gear shifts		
on 7300 Ft. Haul	16	6

The transmission unit averages two gear shifts per minute for a 7.9 minute total haul time. While the transmission may theoretically have an advantage in certain applications, at the same time there is the element of driver comfort which favors the converter. The several hundred clutch disengagement and gear shifting operations, that a driver must make in trucks using standard transmissions are eliminated in converter equipped units.

Let us compare a 15-ton, 22-ton mechanical transmission truck and 34-ton torque converter truck, all operating on a .9 mile haul of average 5% upgrade in an operation in the Western United States. The three units were loaded under the same shovel, hauled over the same road, and dumped in the same area. Haul roads were well maintained and

10 mph. on a 5% grade, yet the 34 ton truck had a faster average hauling speed by 28% and 9½% over the other units. This indicates again that the torque converter, with its automatic adjustment to the grades, roads and loads, is a definite factor in obtaining higher production.

To resolve the question of twin power maintenance by actual field experience, four different combinations were placed in service. The first combination known as the 1FFD, used two GMC 190 hp. engines and twin-Allison converters and Allison Transmissions. The second combination, the 2FFD, used one 400 hp. diesel, a two-plate clutch, a ten speed-transmission and power divider transferring power to the tandem axles. The third combination, the 3FFD, used a 400 hp. engine, a 17-in. single stage converter, two-plate clutch, five-speed transmission and power divider. The fourth combination, the 4FFD used two Cummins engines of 200 hp. each and the twin Allison converters and twin transmissions, similar to the 1FFD.

The single engine truck with converter represented an 11% higher initial investment than the twin engine truck, using two smaller engines of the same engine manufacturer. If we compare converter powered trucks directly, we see there are two engines, two converters, and two transmissions in the twin design; a total of six—but there are only three different types of components.

Thus, servicing these three different components and the matter of parts supply and parts availability is somewhat simplified. In the case of the converter-equipped single engine truck, there is one engine, one converter, one clutch, one transmission, and one transfer case; a total of five different components. But the question is not only "one engine versus two." It is also a question of converter and transmission developed to match each other, and capable of absorbing 400 hp. or more. Such components have not yet been in evidence. In addition, the twin components are those which

are in high volume production. The cost of each component and its parts cost is considerably lower. For example, one engine manufacturer provides 400 hp. in a single engine at a list price of \$10,000. Equivalent horsepower in two smaller engines of 20 hp. each totals only \$7600. While, of course, this condition may change as improvements continue to take place in off-highway equipment, at the present stage of development, it appears that the twin power idea is economically sound. It has fewer "growing pains" because it uses existing proven components.

This twin power idea has been carried to its next logical development by using two engines of 300 hp. each and torque converter drives in a 50-ton rear dump Euclid. Twenty of these are now working at Fort Randall Dam, one of the major earth fill dams on the Missouri River. As equipment gets larger, it is important to properly balance the loading equipment with the haulage equipment. These 50 ton trucks are teamed with 11 cubic yard Marion shovels. The trucks average 16 mph. overall on a 3.8 mile cycle, including loading and all delays. Top speed is 38 mph. Field tests indicate that it can out-produce the 34 ton truck by about 45% when balanced with shovels in the 8 to 11 yard class.

The torque converter and semi-automatic transmission can be teamed with the twin engine idea to produce units having an engine powering a front drive axle, and a second engine powering a rear, or trailing axle. The 1947 model twin-power bottom dump is used in levee building on the Mississippi, and has been used in the lowland sandy areas of New Jersey Turnpike construction. It can plow through soft bottom land where the single drive axle unit does not have sufficient traction. On the Jersey Turnpike, the contractor teamed up one twin power bottom dump to operate with each four conventional bottom dumps. In soft sandy soil, the twin power machine was used to push out the other units, and thus maintain high production in difficult going.



3 50-ton rear-dump truck with two separate 300 hp. Cummins diesels operating at Fort Randall Dam.

wide enough for two-way traffic. Calculated performance was as follows:

Mph. possible on 5% grade:

15 Ton	22 Ton	34 Ton
8% @ 9.5 mph.	6% @ 10 mph	5% @ 10 mph.
3rd gear	3rd gear	

Pounds of gross weight per net hp.:

347	415	450
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Actual field performance showed this:

34 Ton	22 Ton	15 Ton
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Loaded hauling

time	4.26 Min.	4.70 Min.	5.51 Min.
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Average travel

speed	12.6 mph.	11.5 mph.	9.8 mph.
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Based on pounds of gross weight per net horsepower, we would expect better performance for the 15 ton and 22 ton trucks. However, in this instance, the 5% grade requirement did not match the transmission gear splits in the 22 ton and 15 ton trucks. In consequence, on this haul, the 34 ton truck had faster average travel speed. It is interesting to note that all trucks had a speed of 9½ or





Twin-power scraper powered by two 190 hp. GM Detroit Diesel engines driving through Allison torque converters and semi-automatic transmissions. It is stockpiling coal at Avon Lake, Ohio.

In one mine with "average to severe" conditions, differential life averaged 6570 hours. In another with "extremely severe conditions," differential life averaged about one fourth as much. Nickel alloy steels normally used in differential gearing have not been available for these units. Such steels would increase fatigue failure some 50 to 75%. This creates problems, of course, to attempt to isolate the question of differential life. Generally speaking: 1. On average to severe hauls, differential life with converter drive is higher than with transmission. 2. On extremely severe hauls, with high sustained torque loadings, differential life may be considerably less.

It has been the custom to define engine life in terms of hours of operation, yet in its proper application, the torque converter units do more work per operating hour than the conventional transmission unit. Thus, comparison of engine life in hours, is not completely relative. In our experience, there have been few cases where a direct comparison over a long period of time has been possible, where all other variable factors have been standardized to isolate the differences due to the converter versus the mechanical transmission type alone. The matter of engine life has also been complicated due to the different sizes and types of hauling units which Euclid has manufactured. For example, during the period 1946 through 1951, the 190 hp. GM engine was used very successfully in the 15 ton four-wheel rear-dump truck and in the 13 yard tractor-trailer bottom-dump, both using a five speed mechanical transmission. However, when two of the same engines were used with torque converters in a 34 ton rear-dump truck, it was found

that engine life, in terms of hours, was drastically reduced to perhaps 50% as much. Actually with converter, the maximum output of the engine was being more fully utilized within each operating hour.

Thus, in the use of the GM 190 hp. engine, we could not directly compare engine hours of life with and without converter because there were so many other variables involved—different equipment, different application, different severity of service. There is reason to suspect that engine life with converter will be better, as there is less possibility of overspeeding the engine and practically no possibility of destructive lugging. Engine rpm. at stall speed is about 1700 rpm. This is well above the 1200 to 1500 rpm. range where long periods of operation under full load may be detrimental to engine life.

In June of 1951, the first deliveries were made of a 22 ton rear-dump truck using a 300 hp. Cummins engine (NHRS supercharged) and an Allison torque converter with torqmatic transmission. These first trucks are just beginning to accumulate enough hours so that some comparison can be made of engine life with the same type of truck utilizing a ten speed Fuller transmission. On the first converter truck of this type delivered, the engine has been torn down at 5400 hours for inspection. A large earth-moving contractor using 22 ton trucks with and without converters reports as follows: Engine Life: up to 5000 hrs. accumulated on two converter units about 1 year old. These were field conversions. Average engine life before major overhaul is 4000 hrs in gear drive trucks. Trans-

mission and Clutch Life: the two converter and hydraulic transmission units are in 500 hr. mark, with minor maintenance.

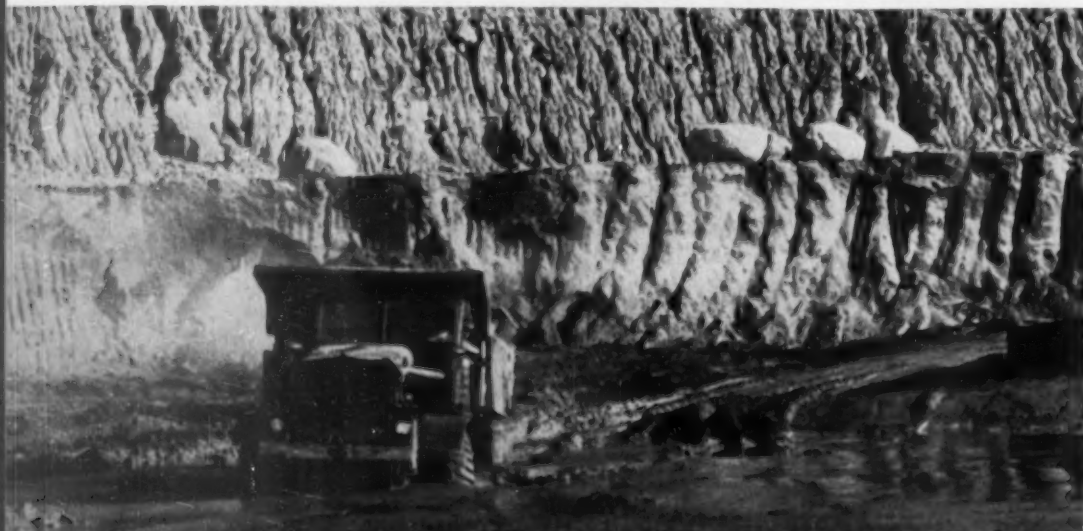
Average on mechanical drive within 5000 hrs. period would be about 3 clutch overhauls and two mechanical gear transmission overhauls. On 4 new trucks with converters delivered June, 1952, 2200 hrs. have been accumulated with no shop maintenance required. On past experience these trucks would have had at least one clutch overhaul and would be due for transmission overhaul. Thus we see engine hour figures are still being accumulated, with a trend showing that engine life is longer in operating hours. There is definite indication that the engine with the converter is doing more work within each working hour when compared with the transmission set-up.

The Allison transmission is used in all standard production converter type Euclids. Average repair parts costs shows \$500 at one installation. Another job averages \$450 overhaul price per transmission, not including labor. From July, 1949 to March, 1952, average transmission life at this latter operation shows 4040 hours. Actually, the present day average is much higher than this figure would indicate. This operator reports that since pressure gauges were installed on transmission and converter, and heat gauges were installed, converter and transmission maintenance has been cut 50% to 70%. Drivers watch the gauges to prevent oil overheating at converter stall. This results in greatly prolonged seal life. Converter oil pressures are maintained which prevents excessive cavitation. Also, the transmission disc type friction clutches have adequate oil pressure behind them to prevent slipping.

The human element is a polite expression covering the problems and production losses through incorrect handling of off-highway trucks and equipment. Idle equipment is an expensive proposition in equipment worth \$30,000 to \$70,000 per unit. In some areas of the country, this problem is so acute that it even overshadows any matter of economics. For example, an operator may apply for a job at a certain mine. His first question is "Do your trucks have torque converters?" If the answer is "No," he looks for employment elsewhere. At the outbreak of the Korean war, a survey was made of manpower requirements at the Minnesota Iron Mining Company and it was found that one of the places where women could replace men was in the operation of the massive 34 ton capacity torque converter drive mining trucks. This work was physically within the capabilities of women, due to torque converters and power steering.

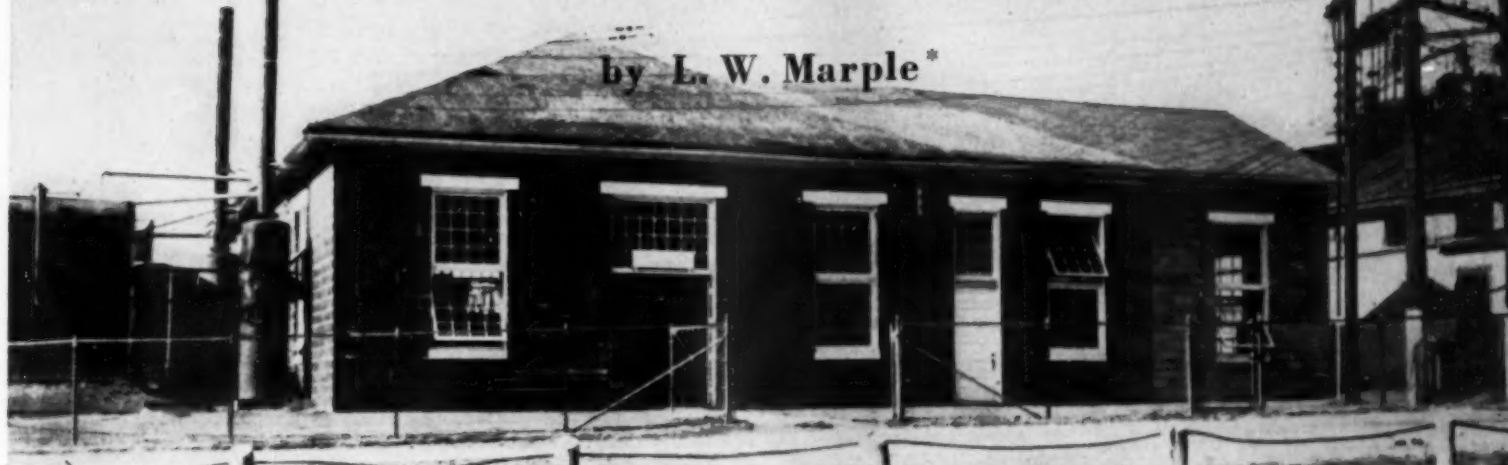
In summary, the converter is here to stay. It fits deep pit hauls, having variable grades. Matched with the hydraulically actuated semi-automatic transmission it shows better driver practices and reduced maintenance vs. the conventional clutch for severe hauls. Because of its lower investment and lower fuel costs on level hauls or fixed grades, the mechanical transmission will still find a proper application. As manufacturers, Euclid is continuing to provide both types, but sales indicate a strong upward trend toward converters in those models where a choice is offered.

A 34-ton rear-dump truck working on the Iron Range of Minnesota. This unit is powered by either two 200 hp. Cummins or two 190 hp. GM Detroit Diesel engines.



WOODSFIELD, OHIO

by L. W. Marple*



WOODSFIELD, Ohio, has cut fuel costs in half by installing a dual-fuel diesel in its municipal electric plant. The new unit is a National Supply Superior; Model 80, 14½x20, 8-cylinder, dual-fuel engine capable of developing 875 horsepower at 327 rpm., direct connected to a 600-kw. generator. Major fuel is natural gas supplemented with 10% diesel oil for ignition. Woodsfield was in the electrical utility business long before 1920 when a steam engine driven generator served the village power requirements. At that time, the small community was not completely wired for lighting, and power was supplied only from 6 A.M. until 8 P.M. each day.

Subsequent to 1920, promotion of electrical appliances for household use became active and electricity consumption increased rapidly. With peak loads steadily rising, the original generating equipment was soon out dated and plans were promptly drawn up for a power plant having greater generating capacity. Thus, in 1922 two 200-hp., semi-diesel engines were installed; each one direct connected to a 136-kw. generator. Then

*Plant Superintendent

in 1935, a third unit, a 350-hp., open-head type full diesel direct connected to a 235-kw. generator was installed. After operating with this equipment for ten years, the village officials investigated the community requirements and decided on replacing the two semi-diesels with full diesels having more power and a higher efficiency. In 1946 one of them was replaced with a 300-hp., "Back-flow" type diesel engine direct connected to a 200-kw. generator, and in 1947 the second was replaced with a similar unit.

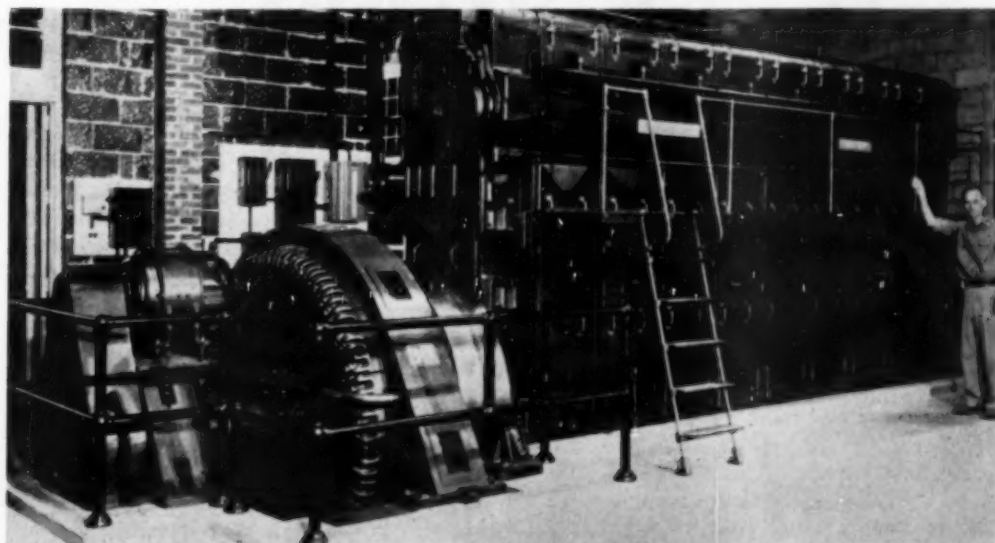
The load continued to grow from both residential consumers and small industries served by the plant. Three feed mills require about 155 kw., while the water purification plant operates motors of 75 and 50 hp. respectively, and the sewage disposal plant has a load of 20 hp. The peak demands in 1922 amounted to about 100 kw. for which the two 136-kw. units were installed. By 1934, and again in 1945, the demand exceeded the plant's safe capability (allowing a capacity equal to the largest unit for reserve) and expansion followed. The same situation again existed in 1948 and by the latter part of 1949 all of the units were operated over the peaks, which ranged from 520 to 560 kw. Any form of failure in the

equipment meant a power loss to at least half of the town as the plant distribution system operates on two circuits.

Faced with these steadily increasing demands, the town purchased the Superior dual-fuel diesel in 1950 and had it in operation the latter part of December of the same year. It can burn either oil or natural gas with equal facility and efficiency and develops the same horsepower rating on either fuel. Fundamentally, the engine simply substitutes a portion of gaseous fuel mixed with air for a corresponding amount of liquid fuel and continues to operate on the diesel cycle with compression ignition.

At the present time, the Superior carries the entire load during the day from 9 A.M. until 11 P.M., and two of the 200-kw. units handle the night load, which averages about 170 kw. In the past, when one of the industrial plants came on the line, lights would dim throughout the community, but since the new unit was put into operation the oncoming loads are picked up without disturbing system voltage. Gas is purchased at 37 cents per thousand cubic feet and latest figures indicate the engine operates at about 4.8 mills per kw. (¾ load), whereas the older engines operate on straight diesel oil at a cost of 9.5 mills per kw. (¾ load). These figures readily indicate that the new engine operates at exactly one-half the cost of the older units, a tremendous saving for the community.

The latest addition to the Woodsfield municipal plant, this Superior diesel develops 875 hp. at 327 rpm. It is direct connected to a 600 kw. generator.



List of Equipment

Dual-Fuel Diesel—National Supply Company.
Generator—Elliot.
Governor—Woodward.
Silencers, Intake and Exhaust—Maxim.
Injection Pumps—Scintilla.
Fuel Oil—Standard Oil Co.
Transfer Pumps—Roper.
Fuel Meters—Buffalo Meter.
Fuel Oil Filters—Purolator.
Lube Oil Filters—Fram.
Oil Cooler—Ross.
Air Filters—Air-Maze.
Air Compressor—Quincy.
Exhaust Pyrometer—Alnor.



From left to right: E. K. Davison, Miss Willa Jean Davison who christened the vessel, H. T. Pott, Mrs. E. K. Davison, Mrs. H. T. Pott.



The twin screw, 800 hp. towboat *J. K. Davison*. She is powered by two 400 hp. Caterpillar engines and is 86 ft. long with a draft of 6 ft.

MOTOR VESSEL "J. K. DAVISON"

WINNING acclaim at every river port between St. Louis and Pittsburgh, the new towboat *J. K. Davison* was recently delivered by the St. Louis Shipbuilding & Steel Co. to J. K. Davison & Bro. in Pittsburgh. Designed and built for the sand and gravel trade in the Pittsburgh area, the *J. K. Davison* is the biggest little boat afloat. Although only 86 feet in length, the new vessel has many features of a much larger boat. Miss Willa Jean Davison, 11 year-old daughter of E. K. Davison, christened the new boat on Saturday, November 8th, at St. Louis, before a large gathering including a contingent of visitors from Pittsburgh. Following the christening festivities, the *J. K. Davison* was delivered to Pittsburgh, making

stops at Huntington, Louisville, and Point Pleasant. Visitors at each of these ports were favorably impressed by the performance and fine layout of the new boat.

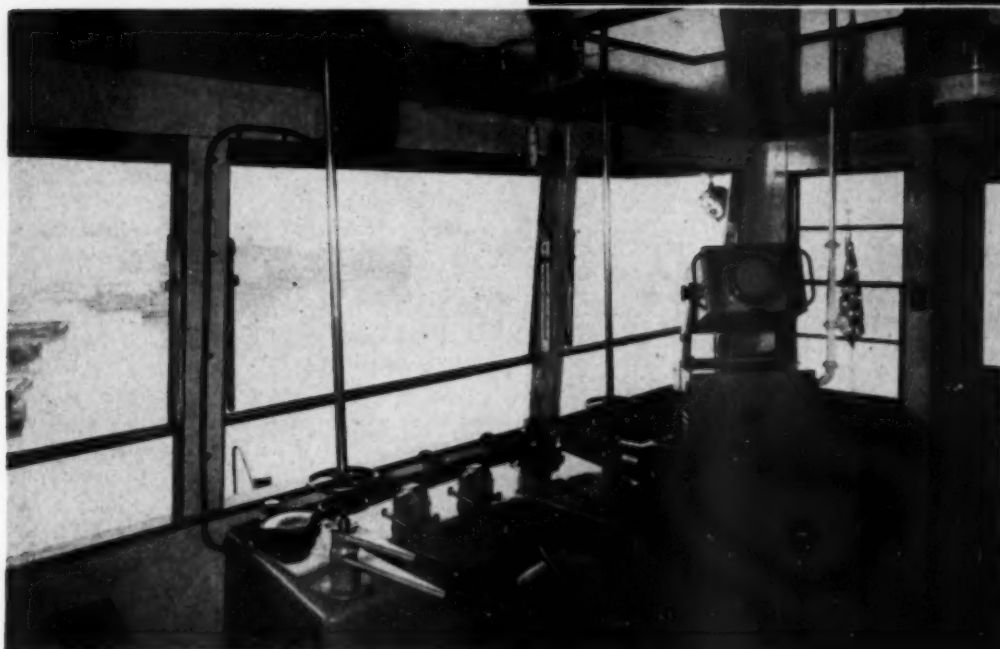
The *J. K. Davison* is 86 feet in length with a beam of 26 feet and a normal draft of 6 ft. Propulsion is provided by two Caterpillar Model D397 diesel engines, each rated at 400 hp. at 1200 rpm. The 66-in. diameter four bladed cast steel propellers turn at 300 rpm. The installation of Kort nozzles and Contraguide rudders gives the *J. K. Davison* 30% greater pushing power. The all welded steel hull is constructed on the longitudinal and transverse framing system. From the modified scow bow there

is an easy flow of water to the two well rounded tunnels. The bottom and sides are $\frac{1}{8}$ in. thick plate, while the bilge strakes, forward rake plating and tunnels are $\frac{3}{8}$ in. thick. The *J. K. Davison* is built to the highest classification for River Service of the American Bureau of Shipping.

The Caterpillar main engines are Model D397 each 400 hp. at 1200 rpm., 12 cylinder, V-type, $5\frac{3}{4}$ -in. bore and 8-in. stroke, fitted with a 4:1 ratio Falk reverse and reduction gear. The engines are controlled from the pilot house by means of the new Caterpillar pneumatic controls. The main engine jacket water is cooled by circulating through the Standard St. Louis Ship skin cooling system. Elec-

tric power is provided by two (2) Caterpillar model D318 generator sets, each 40 kw., 220 volt, 3 phase, 60 cycle. The switchboard for control and distribution of power was manufactured by the Pelham Electric Co. A Gould's fire and bilge pump is driven by a 7½ hp. Century Electric Co. motor with Cutler Hammer controls. Two Gardner-Denver air compressors provide air for engine starting, controls and air whistle. There are two independent steering systems of the St. Louis Ship standard hydraulic follow-up type. One system actuates the two Contraguide rudders, and the other actuates the four backing rudders.

The *J. K. Davison* contains the latest in river navigation equipment and fittings. The pilot house console contains the main engine controls, steering levers, tachometers and gauges. The radio-telephone and radar sets were manufactured by the Radiomarine Corporation of America. The searchlights, which are controlled from within the pilot house are each Carlisle and Finch 14 in. Arc, 25 amp. The air whistle is an 8 in. triplex Kahlenberg



➡ The lower engine room of the *J. K. Davison* showing one of the Caterpillar diesels.



➡ Pilot house showing control stand. Engineered by Caterpillar, it consists of a Westinghouse Air Brake control in the pilot house with Caterpillar control in the engine room and Wagner Electric Company relay valves, etc.



➡ View in machinery room showing Caterpillar generating sets and Pelham switchboard.

Bros. Model T3. From the fine performance already shown, the *J. K. Davison* should give its owners many years of dependable service.

List of Equipment

Main engines—Caterpillar Tractor Co., Model D397, 12 cylinder, V-type, 5¼-in. bore by 8-in. stroke, each rated 400 hp. at 1200 rpm.

Exhaust silencer—Burgess-Manning.

Tachometers and Magnetos—Weston Electric Co.

Pilot house engine controls—Caterpillar Tractor, pneumatic type.

Air compressors—Gardner-Denver driven by 3 hp. Century Electric Co. motors with Cutler-Hammer controls.

Auxiliary generator sets—Caterpillar Tractor Co., Model D318, each 40 kw., 220 volt, 3 phase, 60 cycle.

Generator exhaust silencers—Burgess-Manning.

Generator starting batteries—Goulds.



"MAKING HOLE" FASTER



Drilling rig of Keta Oil and Gas Co., largest of seven rotary rigs now drilling for natural gas in the vicinity of Renovo, Pa. The Ideal type 75CB rig brought in its first well, 7034 ft. deep, in 31 days. Mast is 133 ft. high.

R. E. Willington, Stanton, Texas, driller for Keta Oil and Gas Co. near the controls of the Ideal Type rig in Driftwood Field, near Kenova, Pa.



AN "invasion" of Pennsylvania by rotary drilling rigs is being watched with interest by oil and gas drillers. The event is significant because the eastern United States has been dominated by the older cable tool drilling method ever since Col. E. L. Drake and Capt. Billy Smith brought in the world's first oil well near Titusville, Pa., in 1859. Rotary drilling, which first came into prominence at Spindletop, in Texas, in 1901, is now world predominant, but eastern drillers have preferred cable tools for getting through the hard rock formations of their area.

Seven rotary rigs are now drilling for natural gas near Renovo, Pa., in an area where approximately 70 cable tool rigs are operating. In some cases, the two methods are teaming up, with cable tools being used to penetrate the hard top, of approximately 3,000 feet, after which a rotary rig takes over for the rest of the approximately 7,000 feet required. In other cases, the rotaries start at the surface. Noble Drilling Co. moved in the first rotary rig near Sonestown, Pa., about two years ago. It was a National Supply Type 100. Delta Drilling Co. then shipped in an Ideal Type 50, which had previously been used in Michigan and Kentucky. It has already drilled a number of producing wells, with such success that Delta now has three rotaries in the area. Delta's experience prompted other drillers to bring in rotaries.

Largest of the rotaries in the area is a National Supply Ideal Type 75CB rig completely air operated with Parkersburg 40 in. hydromatic brake and Foster cat heads, operated by Keta Oil and Gas Co. J. H. Minyard, of Midland, Texas, the tool pusher, is quite proud of his new outfit, which, on its first hole, brought in a 1½ million cubic foot producing well at 7034 feet. Drilling with the rotary took 31 days. The Keta rig started its second hole at State Tract D, in the Driftwood field, a mountain top location about 13 miles south of Driftwood, Pa. In 24 days, the rig had drilled to 5,345 feet. It had made 40 "round trips," for changing bits, at an average time of 2½ hours per round trip. It has had no "down time" except for changing connections.

In between jobs, the 133 foot drilling mast, about as tall as a ten story building, had to be lowered and partially dismantled. With the draw works, the engines, three Waukesha LRZ-6, gas and butane, one to power the standby C-250 pump, and all other equipment it was put on trucks and hauled up twisting gravel roads to its new location, in a clearing surrounded by tall white birch trees. Within a few days it was set up and drilling again. The Ideal rig and the Ideal slush pumps are powered by three gas engines. Much of the related equipment, including the rotary, kelly, hook block, and swivel and wire line anchor, is of National Supply make. Spang double seal shrink thread 4½ in. drill pipe is used, with Ideal 6¼ in. collars. Because of the hard rock formation, no casing was required, but 9¾ in. surface pipe was used. Most of the equipment was made, and all of it was furnished, by The National Supply Co. National Supply recently opened a store at Renovo in order to make parts and equipment readily available to drillers in the area.

New Diesel Fire Boat



The most powerful diesel-driven fire boat ever designed is being built for the City of New York by John H. Mathis Company at their Camden, New Jersey yards. Naval architects John H. Wells, of New York, working under the direction of New York Public Works Commissioner, Frederick H. Zurmuhlen, and in cooperation with Fire Commissioner Jacob Grumet, have incorporated the most advanced fire fighting developments into the new boat at a cost of approximately one and one-half million dollars.

The new 129-foot boat is to be powered with two Enterprise DMG-38 diesel engines, rated at 1000 bhp at 425 rpm. These turbocharged engines drive twin propellers raised in a modified tunnel stern which permits the fire boat to operate in the shallow bay waters, but still qualify as a sea-going vessel measuring up to the civil defense requirements. Even if run around, the new boat is designed with sufficient power to pull free without damage to hull or propellers. Unique in the design of fire boats is the separate pumping facility of the New York boat. Two additional Enterprise diesels (DSG-316) supply 1000 bhp. each at 600 rpm. This 2000 hp. will permit pumping 14,000 gallons of water per minute at a nozzle pressure of 150 pounds and still enable the fire boat to have full propulsion power for maneuvering during fire fighting. Another outstanding design feature of the New York fire boats is direct pilot-house control of the main propulsion engines. The Enterprise single-lever control permits direct control of the propulsion engines for ahead, astern and at any rpm. Similar hydraulic units for remote engine control can be installed at other points if it is later deemed desirable.

Deputy Fire Chief John L. Holian was instrumental in the development of the most modern in fire fighting gear, including six monitors, one on the bow, two forward on the pilot house, one ahead of the funnel mounted on a 53-foot tower with two aft of the funnel. The six monitors plus sixteen hose connections are capable of simultaneous operation at full pressure . . . all the while with full mobile power from the separate Enterprise propulsion engines. Also supervised by Chief Holian was the development of special pneumatic tools, chemical apparatus, floats and towing gear for fighting any kind of harbor or ocean fire. The powerful fire boat can function as a tug or tow boat when required so that vessels can be pushed or towed out of danger to or from others. The communication system including the latest radar, telephones, radio, loudspeakers, electronic navigation instruments and other electrical appliances are all supplied power from a 240-120 volt alternating-current system.

This NUGENT FILTER is a Fuel Oil Watch Dog



PROTECTED by Nugent pilot fuel oil filtering, the Fairbanks-Morse 1600 H.P. dual-fuel engine illustrated is establishing a "record" for dependable, economical service at the Wells, Minnesota Power Plant. Formerly a straight diesel, this opposed-piston engine was converted to dual-fuel operation in 1951 and in the next eleven months \$19,000 was shaved off the fuel bill. This unit is one of the first Fairbanks-Morse opposed-piston engines ever to be converted to dual fuel operation.

By keeping the vital pilot fuel oil free from dangerous foreign material, the Nugent #1R Duplex fuel oil filter is a direct aid in the efficient operation of this engine. By actual test on other engines, Nugent filters remove particles as small as a few microns that might otherwise block the fuel injector or accelerate wear and tear on the engine.

Wherever engines must give long, dependable service, Nugent filtering provides the type of protection that is essential. That's why Nugent filters are factory installed on so many leading diesel engines.

Offering more effective filtering at lower cost, Nugent filters are available in a complete range of sizes and types to meet every need. They utilize inexpensive bag type cartridges having 20 times the filtering area of other filters of comparable size. And remember, Nugent filtering means 99.8% clean oil. Write for descriptive bulletin. Send an outline of your filtering requirements for specific recommendations.



Nugent No. 1R Duplex Fuel Oil Filter



Wm. W. Nugent & Co., Inc.
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TWO NEW FIREBOATS FOR THE CITY OF LONG BEACH

THE latest in the long line of Alden-designed dieselized fireboats is for the City of Long Beach, California, and is illustrated by the accompanying drawings and the following description. For its size, this fireboat will yield the largest output of water per dollar of investment of any existing fireboat in the country, and the low unit cost permits a municipality to have two small boats for the price of one large boat; thus, providing greater flexibility of waterfront coverage. The principal particulars of these boats are: Length, overall, 58' 5½"; Beam over guards, 17' 2½"; draft, 5' 10". Construction of hull and house to be of welded steel.

Two dual purpose General Motors Series 6-110 diesel engines serve to propel the boats, as well as to drive through Rockford clutches, two 2250

gpm bronze fitted DeLaval two-stage 10/8 fire pumps for a total pumping capacity of 4500 gpm at 150 psi. The major fire fighting components of these boats are: two 2000 gpm monitors, one fitted with a foam adaptor, twelve 2-1/2" hose outlets, four fitted to foam system. All hose outlets have individual Barton pressurators and Hale quick-acting shut-off valves. Two turntable Wirt & Knox hose reels, each with a capacity of 1000 feet of 2 1/2" fire hose, are located on the after deck providing compact, yet easily accessible hose stowage.

All adjustments for speed of boat and output of pumps can be made from the pilot house. In addition to the high water output, these boats can produce, from 500 gallons of 3% foam concentrate, 165,000 cubic feet of foam for fire fighting in twenty-three minutes through the use of a simple

foam proportioner installation. The closing of an isolation valve allows the foam system to operate through the forward four hose outlets and one monitor, concurrently with water output through the aft eight hose outlets and one monitor.

Williams-Hager spring check valves are installed on the suction side of each pump for the purpose of maintaining a prime at all times, regardless of any trim condition of the boat. A secondary emergency priming system is also provided together with a special fresh water flushing system. The entire fire piping system is of wrought iron. The ship service fire fighting is composed of four 50 lb. CO-2 bottles, two of which lead to the fuel tank compartment and have automatic control. The remaining two bottles are piped to a portable manual CO-2 horn with an extension hose.

Electrical installation is composed of a U. S. Motors 3 kw 115 volt ac. single phase marine diesel generator set for ship service when away from the dock and a shore connection for 115 volts when at the dock. The switchboard includes a transfer switch for shunting the power from the shore line to the ship's generator. No living quarters are provided for on these two boats. A portable transom berth is fitted in the deckhouse for emergency use, and a toilet is installed in the engine room. All other facilities are ashore.

List of Equipment

Main engines—Two GM Detroit Diesel Model 6-110.

Generators—U. S. Motors 3 kw, 115 volt, single phase.

Batteries—Willard Battery Co.

Bearings—E. J. Willis Co.

Bilge Pump—Jabsco Pump Co.

Compass—Wilfred O. White & Sons.

Controls—Adel Instrument Co.

Fire Extinguishers—CO-TWO Fire Equipment Co.

Foam Equipment—National Foam Systems.

Mufflers—Maxim Silencer Co.

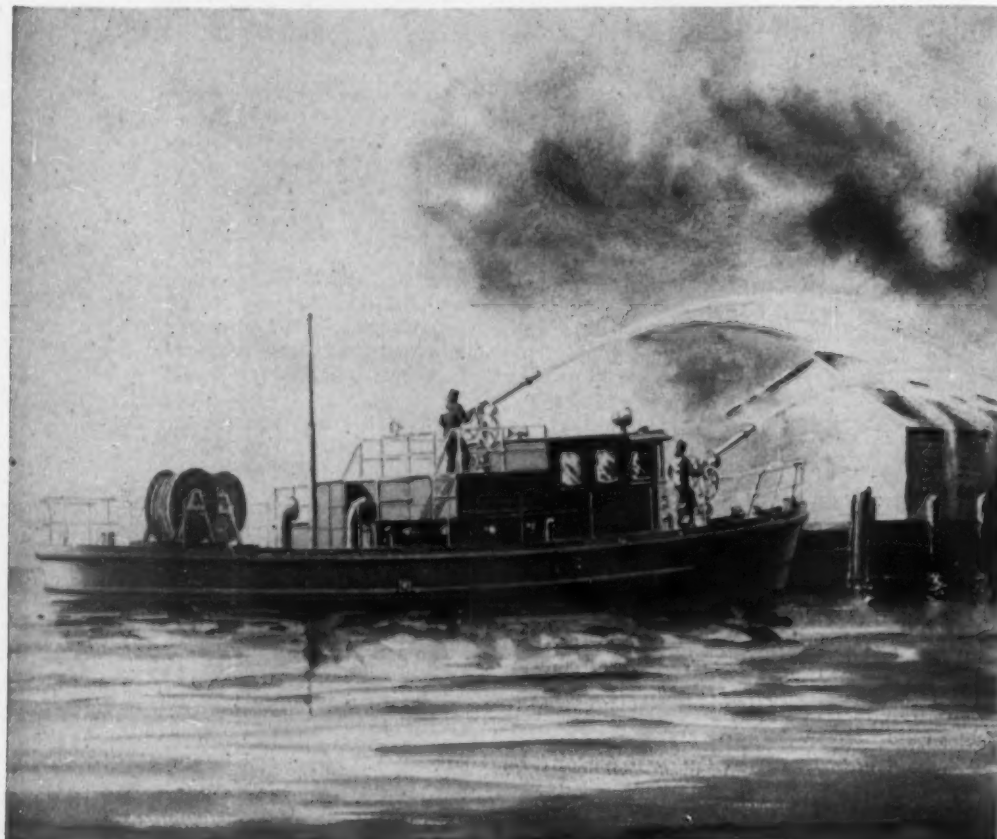
Propeller—Columbian Bronze Corp.

Switchboard—U. S. Motors.

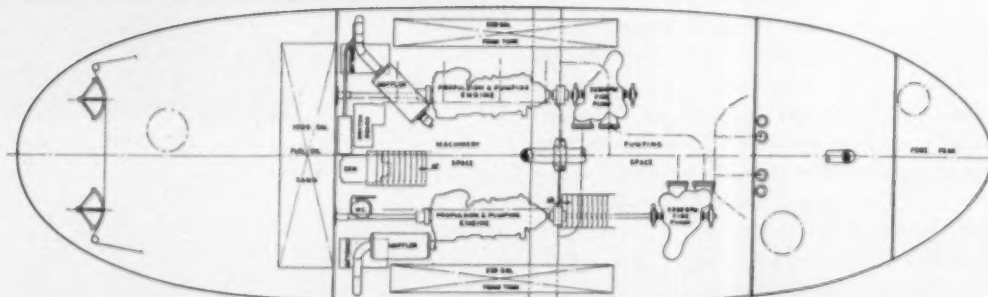
Windlass—Albina Engine & Machine Works.

Air horn—Clark Cooper Co.

Anchors—Danforth Anchors.



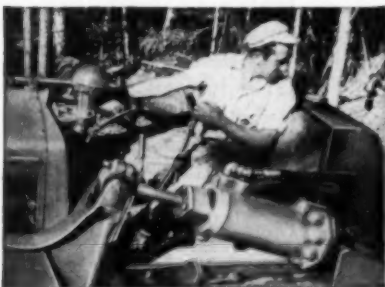
Artist's drawing of one of the Alden designed dieselized fire-boats for the City of Long Beach.



Below Deck Arrangement of the dieselized fire-boats for the City of Long Beach. Note the compact machinery arrangement.



BESIDES CUTTING OUT ROADS, Riendeau uses his TD 14 to push his truck and a 15-ton load through quagmire road sections.



RIENDEAU HANDLES BULLDOZER HIMSELF. He says: "I've had first-hand experience with the terrific performance these highest quality Cities Service Products deliver."

New Hampshire Logger Cuts Truck Roads Through Forest!

Oscar Riendeau of Berlin, N. H., has been hauling logs for about 15 years. To get his lumber out of densely overgrown New England forests, Riendeau has to cut his own truck roads. He carves out his twisting, turning truck roads with an International TD 14 Diesel . . . powered by Cities Service #2 Diesel Fuel! . . . lubricated with Cities Service Lubricants!

Says Riendeau: "I use Cities Service Products throughout my operation . . . diesel fuels, lubricants, gasoline, and even tires. These high quality, dependable products have kept my equipment at work full time under really rugged conditions. I heartily recommend them for any earth moving or trucking operation."

Why not try Cities Service Fuels and Lubricants in your operation?

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DIESEL ENGINE CATALOG

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- Venn-Sevarin
- Waukesha
- White-Roth
- Worthington

National Supply Appointments



Charles K. Olson, Jr.



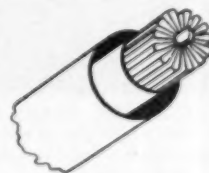
Robert M. Pearson



Philip W. Place

Charles K. Olson, Jr., has been named manager of sales for the Engine Division of The National Supply Company, located at Springfield, Ohio, in a series of advancements within the Division that have just been announced. He had been assistant general manager of the Division since November, 1951. Other advancements are: Robert M. Pearson, for the past ten years manager of sales, has been named manager—Inland Marine Sales for the Engine Division. He will have his headquarters in Pittsburgh, Pa. Mr. Pearson has been with National Supply for seventeen years. Philip W. Place, formerly staff assistant to the general manager, has been named assistant to the manager of sales, with responsibility for general service. He has been with the Engine Division since 1941, and has held a number of engineering positions within the Division during that time. J. H. Newton, who joined National Supply in 1948, and who since then has had increasingly important functions as Applications Engineer for the Engine Division, has been named Staff Assistant to Manager of Sales.

Inner-Fin Oil Coolers



The Inner-Fin Feature.

The Heat-X-Changer Co. of Brewster, N. Y. has introduced a new line of inner-fin oil coolers. Use of longitudinal inner-fins makes possible a more compact unit than has been possible previously. The oil flows through the patented Heat-X inner-fins, which provide generous surface for cooling with minimum pressure drop. Various models are suitable for oil side pressures up to 250 psi. and temperatures up to 300°F. Water side is suitable for pressures up to 150 psi.

The inner-finned element is all copper and is removable for cleaning and replacement. Another design feature is the use of synthetic rubber "O" rings to provide positive seals and eliminate all packed and soldered joints. The entire unit can be disassembled for cleaning or replacement. Applications include: diesel and gasoline engines, hydraulic presses, turbines, gears, compressors, hydraulic couplings, torque converters, transformers, etc. An 8-page color catalog containing complete specifications is available on request from The Heat-X-Changer Co., Brewster, N. Y.

DIESEL PROGRESS 816 No. La Cienega Blvd., Los Angeles 46, California

Enter my order for a copy of the DIESEL ENGINE CATALOG, Volume 18, edited by Rex W. Wadman, for which I enclose \$10.00 (plus sales tax if for delivery in California). Copies may be ordered in the Sterling Area by remitting £4.0.0 to DIESEL PROGRESS, St. Paul's Corner, Ludgate Hill, London, E.C.4.

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Inland River Reports

By David I. Day

THE Superior-powered tug *Dixie*, long flying the flag of the C. J. Dick Towing Co., Houston, Tex., is now the property of the Sabine Transportation Company, Port Arthur, Tex., and has been renamed the *Thor*. The tug, well-known along the canals and the various rivers is a one-engine pusher rated at 1320 hp.

WE WERE glad to see recently the new 1400-hp. *Fulcan* of the Jones & Laughlin Steel Company working with standard coal tows on the Monongahela River. The boat is powered with twin Superior diesel engines.

OFFICIALS of the firm of J. K. Davison & Bro., in Pittsburgh were lavish in praise of the new St. Louis ship built towboat called *J. K. Davison* noted pushing a standard 8-barge sand and gravel tow. "Performing far beyond expectations," was the consensus of comment. Her 800 hp. Caterpillar engines, Kort nozzles, and Contraguide rudders are evidently functioning in fine shape.

OUR compliments to the *Liberty* of the Union Barge Line, Pittsburgh. She is one of the fastest and most dependable boats in operation at this time. She has twin General Motors diesels and was originally the *Johnny Walker*. When seen she had a mixed tow of seven barges of scrap, oil, coal, and fluorspar, pushing along also for full measure nine or ten empties.

THE *Tow Sawyer* of the Federal Barge Line fleet made the first pay-load trip up the Missouri River this spring with a mixed tow for Kansas City. She was built in 1933 at Midland, Pa., but is still a smooth-running work boat. She develops 1180 hp. with twin McIntosh & Seymour diesel engines.

THE last 30 days has not been a period of large tows on any of the rivers visited. The biggest observed at close range was on the upper Ohio, pushed by the *Neville* of the Union Barge Line, 16 loaded barges of steel mostly, with a big flock of empties. It was a most impressive sight from the vantage point of a river bridge. The boat is 18 years old, built by Dravo, but her General Motors engines have been in use only since 1948. The boat is rated at only 1740 hp.

THE *Cornelius Kroll* oil tows from Houston to the upper Ohio are being brought by three fine tugs. The *Percheron* with a 900 hp. General Motors engine works in the canals and lower Mississippi, the *Suffolk* works the lower Ohio and part of the Mississippi using two General Motors engines (1800 hp.) and the *Seneca* is on the upper Ohio, using twin Cooper-Bessemer (1200 hp.). The *Seneca* is the converted steamer called the *W. M. Rees* and has been on the rivers 40 years.

NORMAN ELLIS, Chicago, in the South on business wrote in late April of his delight in seeing the old-timer *Chas. W. Snider*, owned by Pure Oil Co. She has three Cooper-Bessemer rated at over 1500 hp. Mr. Ellis took a picture of the *Snider* approaching the landing at Greenville, Miss.

NEW Model HUD Disconnecting Hydraulic Power Take-Off ...

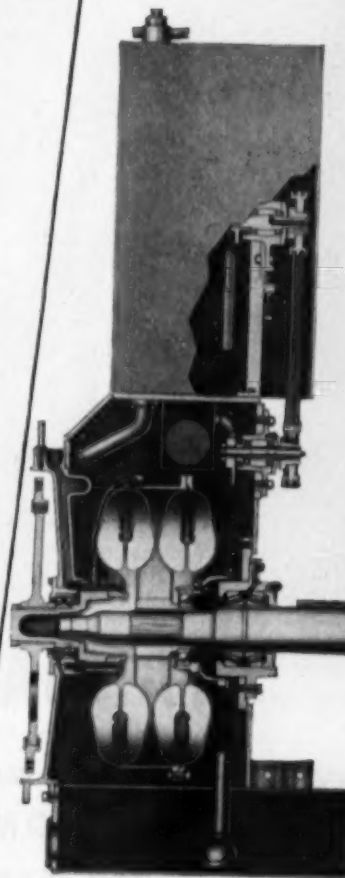
Reduces Impact Shocks 70%

Doubling wear life on chains, clutches and running parts, drilling rigs equipped with the new Twin Disc Disconnecting Hydraulic Power Take-Offs have been running up outstanding service records during the past two years. Many rigs now drill deeper, more economically, because the new Twin Disc Model HUD allows the full use of peak engine torque ... dampens starting shocks, stopping shocks and overloads. Through the complete Disconnect feature, the HUD acts as a master clutch.

Steady power transmission through Twin Disc HUD softens and controls speeds of acceleration and deceleration ... to reduce impact shock—on power units and driven equipment—by 70% or more. Compounded drives can easily be synchronized—drum clutches can safely be engaged with engines idling, for smoother load pick-up—the range of available mud pump speeds and pressures can be greatly extended. Rig engines, free to run at their most efficient rpm, prevented from lugging or stalling under load, are assured of a longer, more serviceable, trouble-free life.

For complete information on how Twin Disc Disconnecting Hydraulic Power Take-Offs are adding efficiency to modern drilling rigs, contact your nearest Twin Disc Factory Branch, or write to the Hydraulic Division, Rockford, Ill.

Twin Disc Model HUD Disconnecting Hydraulic Power Take-Off—available in coupling sizes 21" and 27", to handle 60 to 600 hp engines ... operates with either cooling radiator or heat exchanger ... incorporates shortened oil sump to fit rig design.

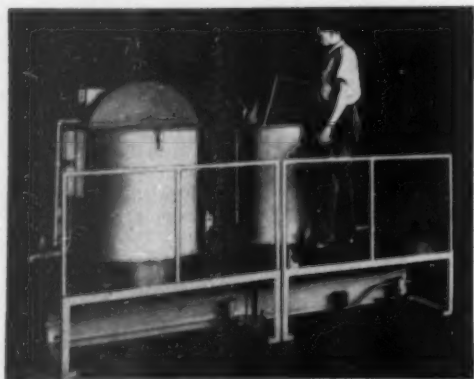


Built for a Long Life ...
Backed for
a Lifetime

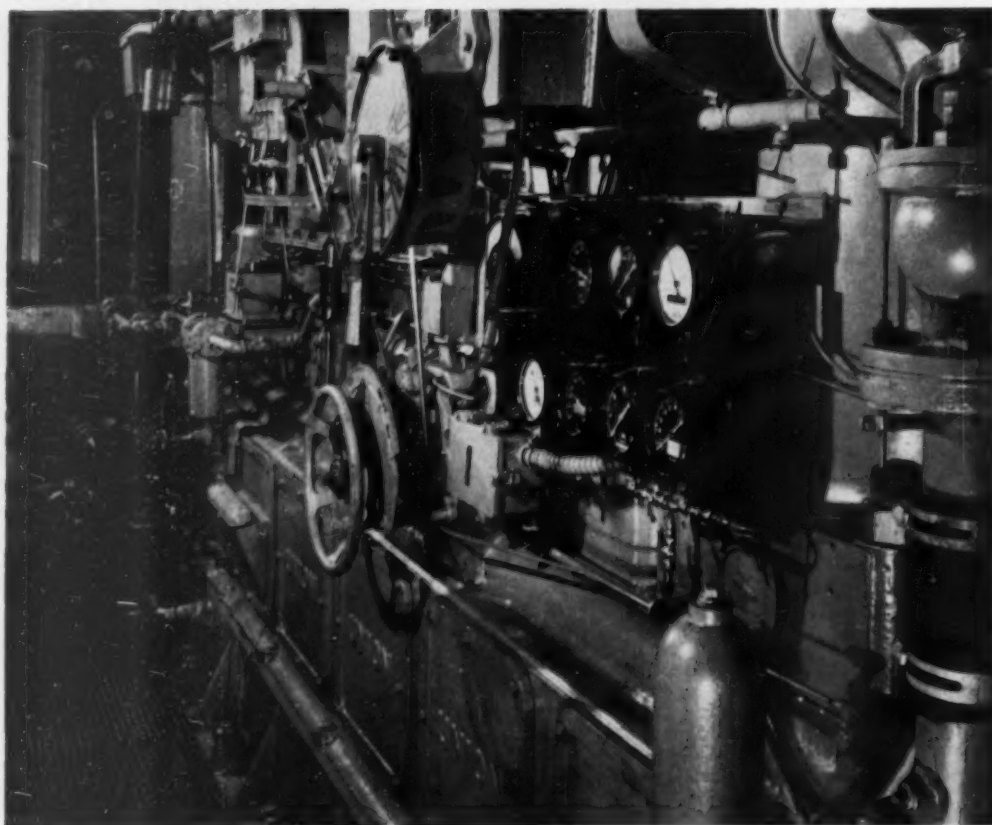


TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois
BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

Filter Washing and Oiling Machine



Mechanical application of the new semi-fluid air filter coatings is now completely and satisfactorily solved, according to the Paxton-Mitchell Company of Omaha, Nebraska, manufacturers of filter washing and oiling machines. Shipment of the first machines of a new design which it claims offers the utmost in cleaning and oiling efficiency, is now being made by the Omaha railway supply and equipment firm. The new machines are designed to be used as companion units—one being the washing machine, which functions somewhat like an automatic clothes washer—the other is the oiler, which operates on an automatic cycle, applying the coating material at a controlled temperature in the correct amount recommended for greatest filtering efficiency.



STANDARD OILER

owned by

STANDARD OIL COMPANY OF CALIFORNIA

SAN FRANCISCO, CALIF.

This fine vessel is representative of sixty-five similar Union Diesel powered tankers in use throughout the world. All are propelled by Model V6 Union Diesels as illustrated above. They develop 560 horsepower when naturally aspirated, or 840 horsepower when super charged, both at 325 rpm.

The **UNION DIESEL ENGINE Co.**
2121 DIESEL STREET • OAKLAND 6, CALIFORNIA, U. S. A.

Application of the new semi-fluid coatings had previously presented special problems due to their heavy consistency. Under earlier application methods, it was necessary to heat the material and pour it over the filters or dip the filters into hot solution and then extract the excess by spinning. Paxton-Mitchell engineers claim that this new oiler achieves the desired results doing the job quickly and automatically. Aside from the fact that the new oiling unit provides for application of any type of coating, including the semi-fluids, the manufacturer says that possibly the most important feature is the cycling system which operates automatically, applying precisely the specified amount of coating on each filter treated, then shutting itself off. All the operator has to do is load the machine, push a button to start and then unload the filters when the machine stops. This is said to eliminate the chance for error on the part of the operator in applying too much or too little coating on the filters. The cleaning cycle of the washer is manually controlled. This permits the operator the necessary latitude for the degree of washing required to get the filters thoroughly clean.

Dubbed the filter "Twins" by the manufacturer, the two machines are said to be complete, packaged units which let one man do the entire job of cleaning, drying and oiling standard size, permanent-type air filters at high speed and with a quality of cleaning and oiling performance never before possible by other methods. Centrifugal force, combined with the cleaning and oiling cycles of the washer and oiler machines does the work quickly and efficiently, it is claimed, so that each filter comes out thoroughly cleaned and with the amount of coating specified by the manufacturers of the coating material. In addition to greatly reducing the cost of maintaining air filters, the manufacturer asserts that with the new washer and oiler installed at each filter service point, the need for keeping large inventories of filters is thus eliminated since the filters may be cleaned and oiled and immediately returned to the locomotive or car. Additional information is available by writing Dept. A7, Paxton-Mitchell Company, Omaha 5, Nebraska.

Expands Manufacturing Facilities

Increasing requirements for O-rings, one of the simpler sealing devices for mechanical equipment, has prompted National Motor Bearing Co., Inc., to expand its O-ring manufacturing facilities and to include O-rings among the sealing items distributed through its nation-wide sales staff and jobber organization. An NMB subsidiary, Arrowhead Rubber Company, at Downey, California, pioneered O-ring development when the Air Force first became interested in the device during the war. First application of O-rings was on pneumatic equipment on aircraft. Since that time, O-ring use has extended to practically all kinds of hydraulic and pneumatic apparatus, both static and dynamic.

YOUR COPY OF DIESEL ENGINE CATALOG in its eighteenth completely re-edited, revised and expanded edition will be ready to mail June 15. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this latest edition now. Profusely illustrated. \$10.00. Mail checks to **DIESEL PROGRESS**, 816 North La Cienega Blvd., Los Angeles 46, California.

DIESEL PROGRESS

Florida Diesel News

By Ed Dennis

A FAIRBANKS Morse 450 hp. diesel for the *Della Mae*, converted and repowered from a Navy mine-sweeper; a 45 hp. Fairbanks Morse diesel with a 25 kw. Westinghouse generator for auxiliary power, Bowers marine batteries and Diehl electric motors. Capt. John Francis is the proud skipper.

CIA DE INDUSTRIAS MARITIMA of Port au Prince, Haiti, received two model GEB 8 Sterling diesel engines with 100 kw. Westinghouse generators for a power plant from Auto Marine Engineers of Miami.

RECENT International Harvester diesel additions at the Toppino rock pit in Key West were a TD 18 dozer, a UD 18 on a Le Roi air compressor plus a UD 24 for a model 500 two stage Ingersoll-Rand air compressor.

TWO Cummins diesels 300 hp. each in the 84 ft. yacht *White Swan* which recently sailed for Newport, Calif., to its new owner C. W. Coulter of Phoenix, Arizona.

STAMAS SHIPYARD at Tarpon Springs launched a 65 ft. party fishing boat powered with two GM 6-71 diesels and over at Sarris & Sons Shipyard a 75 ft. shrimper powered with a D 13000 Caterpillar hit the waters.

A 400 hp. Atlas diesel for the 103x23 ft. *Lady of Fatima*, a 72x50 Columbian propeller, the deck winch is powered by a 90 hp. GM diesel; cost of this new fishing boat was about \$180,000, and on her first trip 200,000 lbs. of fish were caught.

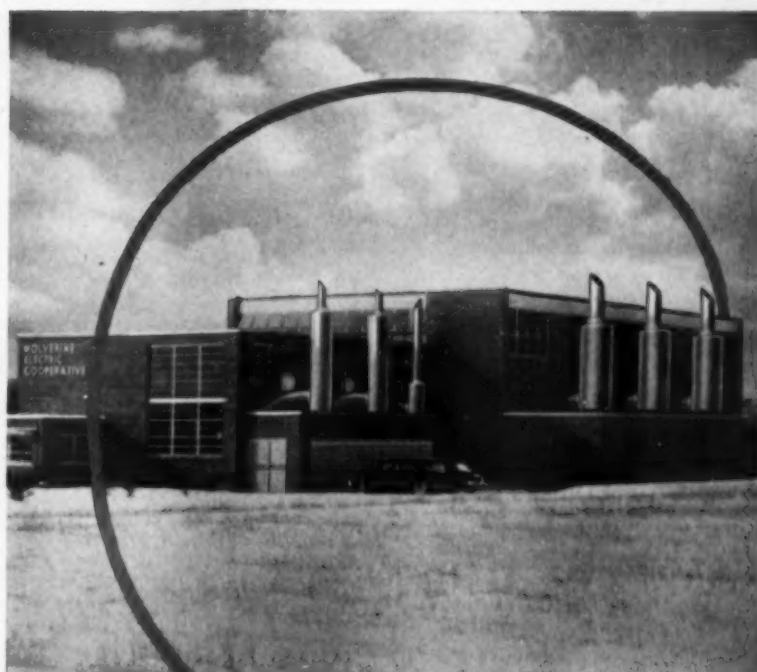
FLORIDA DIESEL ENGINES Sales at Jacksonville supplied the General Motors 6-71 diesel for the *Mildred K.* a 67x18 Tams designed shrimper owned by J. F. Scott of Tampa.

SEEN in the Gulfstream the yacht *Penquin* of Boston with 2 Cummins diesels, the *Jacques* powered with two Hercules and the *South Wind* of Port Washington, N. Y., with her two 4-71 G. M.'s and a Witte diesel generating set.

JACKSONVILLE Yacht Storage proudly announces the launching of the 73 ft. *Briny Marlin* a package unit shrimper of a new design for long range fishing. Specifications are: 190 hp. Murphy diesel, Snow Nabstedt reduction gears, Twin Disc power take-off.

SHELLEY Tractor & Equipment Co. of Coral Gables shipped a D 7 Caterpillar tractor to Champion Supply Co. and a No. 12 grader to Finley P. Smith; both of Fort Lauderdale.

KENNEDY Marine Engine Co., of Biloxi, Miss., supplied the GM 110 diesels for the two 65x20 ft. twin screw off shore steel standby boats for Twenty Grand Co. The boats are also equipped with Onon diesel light plants, Surratte 31 plate batteries. They also supplied the GM 275 hp. diesels for a 58 ft. tug along with a 5 kw. Onan diesel generating set.



Fairbanks, Morse and Company and Cooper-Bessemer Corporation Diesels, equipped with exhaust Snubbers.

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by

BURGESS-MANNING COMPANY



*Typical Snubber

... wherever the flow of AIR, STEAM, and other GASES create N-O-I-S-E.

Standard Snubber* designs are available, incorporating Air Cleaning, Spark Arresting, Water Separation, Waste Heat Recovery, and Surge Control Features.

You can depend upon Burgess-Manning Engineers for a quality product . . . and SOUND ENGINEERING counsel to solve your noise problems.

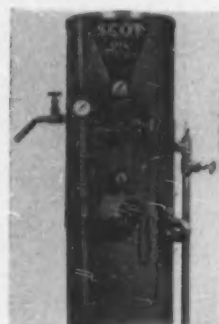
BURGESS-MANNING COMPANY

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Dallas

Re-Refining Oil



A practical, small re-refining unit for used oil has been placed on the market. This unit, the Scot Oil Re-Refiner, re-refines the oil in four distinct steps. They are: 1. activation clay treatment; 2. vacuum distillation; 3. steam stripping; and 4. filtration. This method parallels the methods used in large refineries.

The resultant product, according to manufacturer, equals new oil as a lubricating medium.

The Scot Oil Re-Refiner is a compact, easy to operate unit which is available in two sizes, the 25 quart per hour unit and the 50 quart per hour unit. The re-refiners are electrically heated, having no moving parts other than one electric motor and an agitator shaft. They require only three minutes of labor to start and five minutes to change the filter paper after every 25 quart batch. Recovery is from 85% to 90%. For more detailed information on the Scot Oil Re-Refiner, write to DIESEL PROGRESS, File 107, Box 8458, Cole Station, Los Angeles 46, California.

Westinghouse Air Buys Le Tourneau

Westinghouse Air Brake Co. has announced the purchase of the earth-moving and related business

of R. G. Le Tourneau, Inc. for a reported \$19.5 million. Le Tourneau builds a full line of earth-moving equipment, including scrapers, bulldozers and special equipment for logging, mining, snow removal and other industries. Plants are at Peoria, Ill. and Toccoa, Ga. Westinghouse Air Brake will take over these plants. Le Tourneau's interest in an Australian subsidiary and certain current assets.

The new company will be operated as the Le Tourneau-Westinghouse Co. No change in personnel is contemplated. Mr. Le Tourneau, president and founder, will devote part of his time to the new company as consultant. R. G. Le Tourneau Inc. will continue to operate its Vicksburg, Miss. and Longview, Texas plants and manufacture special products for the U. S. Government, land clearing equipment, cranes and other products not related to earth-moving.

Miehle-Dexter Superchargers



Hans Bohuslav



A line of positive displacement type superchargers, which have been standard equipment on many well-known diesel engines for years, is now being produced in Racine by the Miehl-Dexter Supercharger Division of Dexter Folder Co. In addition to these standard superchargers, special designs for new engine models and other industrial uses are being developed, and competent engineering advice on the application of superchargers and blowers to engine is available. Mr. George Heintzmann, president of Dexter Folder, announced that all machinery, tools, fixtures, test equipment, drawings, etc., have been transferred from the Pesco Division of Borg-Warner Corp. in Cleveland to Racine. New machinery added to the plant, now owned by Miehl-Dexter, rounds out the facilities into one of the country's most modern and efficient supercharger manufacturing plants.

General Manager of the Division is Mr. Hans Bohuslav, formerly chief engineer and engine consultant for R. G. LeTourneau, Inc. Well known in the diesel and gas engine fields, Mr. Bohuslav has served as vice president in charge of engineering, Sterling Engine Company, Buffalo, N. Y., and as chief engineer of the Enterprise Engine Company, San Francisco, California. Starting with a healthy backlog of orders for engine manufacturers such as Buda, Fairbanks-Morse, Cummins, Murphy and others, the new plant is just getting into operation.

General Manager of the Division is Mr. Hans Bohuslav, formerly chief engineer and engine consultant for R. G. LeTourneau, Inc. Well known in the diesel and gas engine fields, Mr. Bohuslav has served as vice president in charge of engineering, Sterling Engine Company, Buffalo, N. Y., and as chief engineer of the Enterprise Engine Company, San Francisco, California. Starting with a healthy backlog of orders for engine manufacturers such as Buda, Fairbanks-Morse, Cummins, Murphy and others, the new plant is just getting into operation.

There is a vast difference between the easy job of

removing warm water, dirt, and pipe scale from warm

diesel fuel (Vis. 35SSU @ 122°F) compared to the

almost impossible job of removing cold water, or

ice crystals, from cold, viscous diesel fuel @ 10°F.

The 4-Stage EXCEL-SO Separator/Filter is designed

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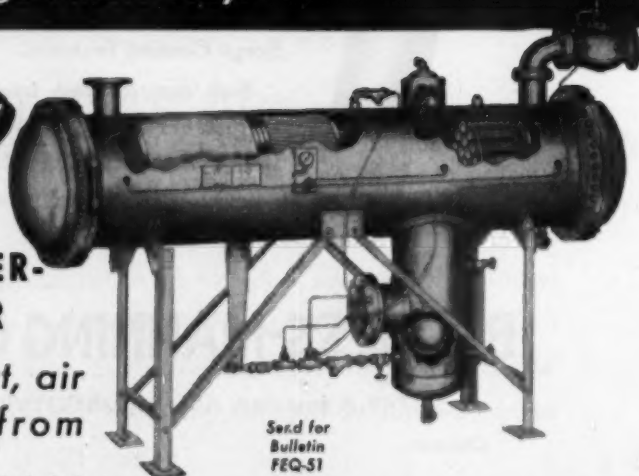
at less operating expense, than conventional single

stage, or two-stage Filters only.

EXCEL-SO

4-stage SEPARATOR-FILTER- AIR ELIMINATOR

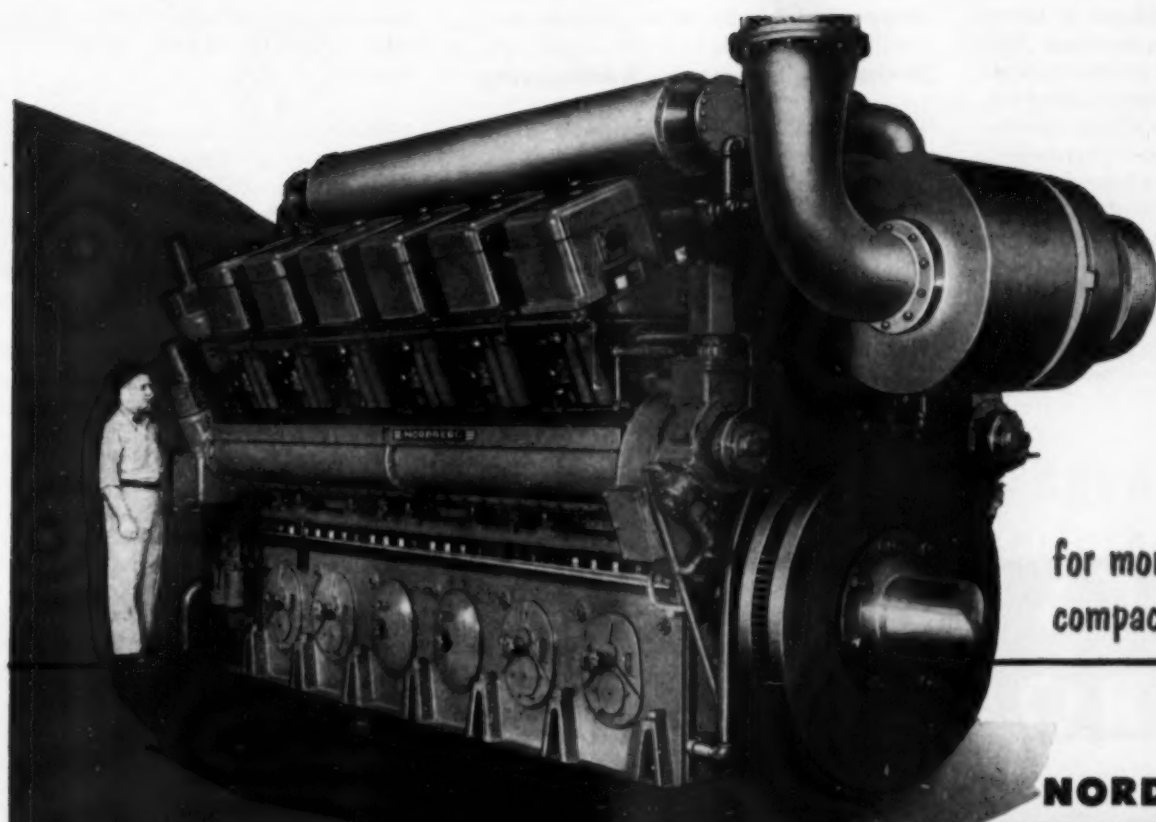
removes water, dirt, air
and pipe scale from
diesel fuel.....



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compact power . . .

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FOUR-CYCLE V-TYPE ENGINES

- COMPACT
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- DEPENDABLE
- RUGGED CONSTRUCTION
- WIDE HORSEPOWER
AND SPEED RANGE

*. . . another important Nordberg advancement in the design
and development of more efficient engines*

Here is the Nordberg four-cycle SUPAIRTHERMAL V-Type engine . . . designed and built for continuous low cost operation for a wide range of stationary and marine power applications. This engine is available in 12 or 16 cylinders of 13" bore in Diesel, Duafuel or Spark-Fired Gas types from 2400 to 4260 hp at 450 to 600 rpm.

The design of this V-Type engine incorporates all tested and proved performance features of Nordberg 13" bore in-line SUPAIRTHERMAL engines. The high thermal efficiency of the SUPAIRTHERMAL engine is made possible by variable inlet valve timing control . . . an exclusive patented Nordberg feature.

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Builders of America's largest line of heavy-duty Diesel engines from 10 to over 10,000 horsepower

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SPARK-FIRED GAS ENGINES



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write for
DUNASTON 197.

P-888

New Catalog on GM Dieselized Euclids

The Euclid Road Machinery Company of Cleveland has issued a new catalog describing their line of earth moving equipment powered by General Motors two-cycle diesel engines. Pictured are heavy duty trucks of from 10 to 34 tons capacity, bottom dumps, scrapers and loaders. Illustrations of the various engine models and cutaway views of the Allison torque converter and torqueomatic transmission are also included. Featured for the first time is equipment now powered by General Motors 275 hp. 6-110 diesel engine. The catalog contains a complete list of Euclid distributors and branches and an extensive listing of GM diesel engine servicing points. A copy of the book may

be obtained from Euclid distributors and branches or by writing direct to the Euclid Road Machinery Company, Cleveland 17, Ohio.

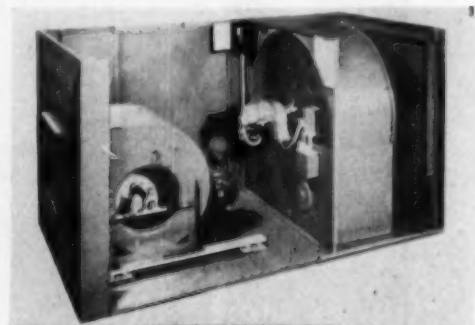
Service Plan Initiated by Westinghouse

Westinghouse Electric Corporation, in cooperation with diesel-electric locomotive builders using Westinghouse electrical equipment, has initiated a new plan for handling electrical renewal parts and "Unit Exchange" equipment. Under the new plan, Westinghouse is responsible for handling directly with the railroads all inquiries, negotiations, and orders involving the following: Main propulsion and auxiliary electrical-energy generating equipment; electrical control apparatus; trac-

tion motors, pinions, gears and gear cases; all renewal parts for this apparatus; and V-belts for main generators. All other locomotive equipment remains the responsibility of the locomotive builder.

Westinghouse maintains stocks of electrical renewal parts in warehouses strategically located throughout the country. Under the Unit Exchange arrangement, fully-guaranteed electrical rotating units are stocked at 16 locations in the United States. When a customer needs a replacement unit it is shipped to him from Westinghouse stock. The replaced unit is returned to Westinghouse for reconditioning and is placed in the Unit Exchange pool. Westinghouse also has 23 repair plants available at convenient locations that specialize in diesel traction apparatus repairs.

Adds New Features to Package Cooler Unit



Farr package cooler with top and side housing removed to show easy accessibility.

Several new features have been incorporated in the Farr-Air Package Cooler for 1953, according to J. D. Campbell, Sales Manager of Farr Company of Los Angeles, manufacturers of Farr-Air filters and air filtration equipment. The unit includes filters, cooler, blower and motor, and automatic flushing controls. Thermostat control can be incorporated. New features in the unit include an improved chemical brick in the water tank to prevent accumulation of salts and minerals on the rotor, and perfection of a system for automatic, periodic draining and flushing of the water tank to remove accumulations of minerals and organic material and maintain a clean unit with a minimum of attention.

Efficiency is exceptionally high and is maintained constantly, Mr. Campbell said, and the unit is guaranteed to deliver rated volume at a static pressure depression less than .40 in. of water at the blower inlet. It will cool from 100 degrees and 20% relative humidity to 75 degrees at rated volume, it was claimed, and the cooler is considered especially suited to any area where there is a difference of 20 degrees Fahrenheit or more between wet and dry bulb thermometer readings. Because of the combined filtering and humidifying action, the cooler is especially effective in hot, dry areas and in institutions where pulmonary ailments are being treated. All parts are corrosion-resistant, constructed of bronze and stainless steel. Complete information may be obtained by writing Farr Company, P. O. Box 10187 Airport Station, Los Angeles 45, Calif.

CLUTCHES by ROCKFORD



This "Tough Trencher" Speeds "Big Inchers"

The Cleveland Trencher combines advanced engineering principles with tougher materials and lighter weight to speed up and increase the variety of its trenching operations. ROCKFORD CLUTCHES and POWER TAKE-OFFS contribute to this modernizing development. LET ROCKFORD clutch engineers help improve the power transmission control in your construction machines.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



ROCKFORD CLUTCH DIVISION

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ROCK
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Federal Fawick Appointments



Theodore E. Metz

John V. Eakin

R. S. Huxtable, president of Federal Fawick Corporation, has announced the appointment of John V. Eakin as general manager of Fawick Airflex Division, and Theodore E. Metz as advertising manager of the corporation. Mr. Eakin has been with the company since 1943 and was formerly assistant general manager, sales manager, and southwestern district manager. In his new position, he will be responsible for the direction of Fawick Airflex Division, manufacturers of industrial clutches and brakes and related products. Before joining Fawick, Mr. Eakin was employed for three years in the engineering department of the National Supply Company, Toledo, Ohio, a leading manufacturer of petroleum equipment.

Mr. Metz has been the advertising manager of Fawick Airflex Division and of the Fawick Airflex Company prior to the merger of Fawick and Federal Motor Truck Company, Detroit, Michigan. He has been with Fawick since 1948, having previously been a member of the sales department. In his new position Mr. Metz will be responsible for the administration of advertising and sales promotion for the corporation; Fawick Airflex Division; Fawick Brake Division, Detroit, Michigan, manufacturers of the new Fawick Hydro-air Dual System vehicle brake; and Federal Motor Truck Division, manufacturers of Federal Motor Trucks. Prior to joining Fawick, he was employed for two years in the sales department of the Herrick Company, Boston, Massachusetts, wholesale steel distributors. During World War II he served in the United States Marine Corps Reserve, attaining the rank of First Lieutenant.

New York Central Expands Dieselization

The New York Central System has announced that it has placed orders for 164 more diesel-electric locomotive units, costing approximately \$27,500,000. When deliveries are completed by this fall, these will fully dieselize all Central service east of Cleveland, and passenger service east of Detroit.

Symbolizing the end of an epoch, this will mean elimination of the last steam locomotives on the Central's 2,800 miles of roadway within New York State. It was on the 16-mile line between Albany and Schenectady, N. Y.—where some of these new diesel-electrics will be manufactured—that a Central predecessor railroad, the Mohawk and Hudson, inaugurated steam-powered travel in New York State in August, 1831, with an historic, wood-burning locomotive called the DeWitt Clinton, a brave, 11½-foot predecessor of the coal-fired steam locomotives of later generations.

With the new order, the Central will have 2,113

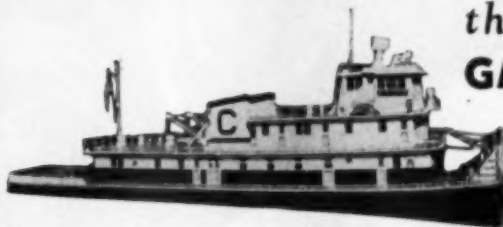
diesel units—more than any other railroad—with a total horsepower of 2,758,900. This will amount to approximately 60 per cent of the horsepower necessary for complete dieselization of the system. Of the locomotives, to be built by the Electro-Motive Division of General Motors at LaGrange, Ill., and the American Locomotive Co. at Schenectady, N. Y., the Central itself will receive 124 of the new diesels, while 40 will go to the affiliated Pittsburgh and Lake Erie Railroad. Thirty-four units will be 2,250-horsepower passenger engines, 80 will be 1,500 and 1,600-horsepower road switchers for use in passenger, freight and switching service, 15 will be 1,500 and 1,600-horsepower units for freight and switching service and 35 will be 1,000-horsepower yard switchers.

Presently all freight service east of Cleveland is dieselized with the exception of several steam locomotives on the Beech Creek branch in Pennsylvania. Passenger service on the affiliated Boston and Albany and P&LE railroads is fully dieselized, as are virtually all New York-Chicago and New York-St. Louis through trains. Diesels also perform all the work on the affiliated Peoria and Eastern, Indiana Harbor Belt and Chicago River & Indiana railroads.

YOUR COPY OF DIESEL ENGINE CATALOG in its eighteenth completely re-edited, revised and expanded edition will be ready to mail June 15. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this latest edition now. Profusely illustrated. \$10.00. Mail checks to DIESEL PROGRESS, 816 North La Cienega Blvd., Los Angeles 46, California.

HIGHER TONNAGE --- GREATER SPEED

that's the new
GM-DIESEL POWERED
JOS. CHOTIN



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NASHVILLE BRIDGE CO.
DESIGNERS AND BUILDERS

and it's
equipped with

Briggs
PIONEERS IN MODERN
OIL FILTRATION

FUEL OIL AND LUBE OIL FILTERS

FOR BETTER, LONGER AND MORE ECONOMICAL OPERATION

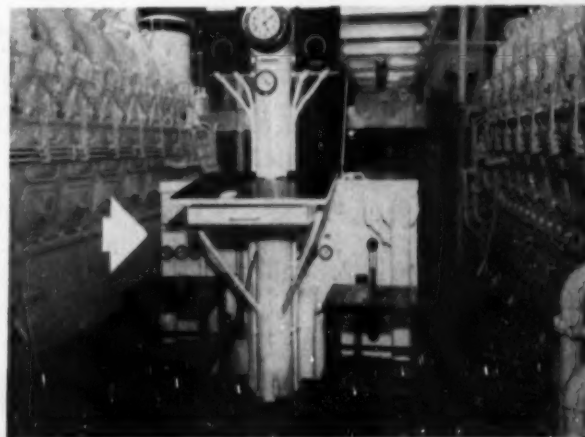
TWO BRIGGS
CD TYPE
OIL CLARIFIERS
IN THIS MODERN
ENGINE ROOM

PLUS

A BRIGGS FUEL OIL
FILTER, NOT SHOWN,
SERVING BOTH OF
THESE POWERFUL
GM DIESELS

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For literature on Briggs
filters for marine use.



Dependable oil filtration depends upon filtration experience—lowered cost of steady operation is the direct result of over a quarter of a century of building lasting economy into dependable oil filters.

THE BRIGGS FILTRATION CO., RIVER ROAD, WASHINGTON 16, D. C.
"For over a quarter of a century"



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Schwitzer-Cummins Company, for 25 years the foremost builder of Positive Displacement Superchargers, now announces their latest engineering achievement, an Exhaust Driven Turbocharger with these outstanding features:

- First Lightweight, Low Cost Unit for Diesel Engines in the 100 to 200 Horsepower Range in the U. S. A.
- Simple, Reliable, Rugged Construction.
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SUPERCHARGERS
(POSITIVE DISPLACEMENT)

OIL PUMPS

WATER PUMPS

**CRANKSHAFT
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TRANSMISSION AND
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Chrome-Faced Cyclan Ring

More about Cyclan

Sealed Power's amazing new
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What Cyclan is...

Cyclan is a high-strength, heat-treated alloy iron with strength approaching that of steel, and with resilience and life-expectancy far exceeding cast iron. Cyclan has the ability to retain its physical properties under extreme operating heat. Its bearing characteristics resemble those of cast iron. Cyclan was developed by Sealed Power.

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Cyclan stands up where engines are subjected to extreme operating conditions, pulling heavy loads over rugged terrain. Cyclan piston rings will not break in super-charged engines. Their tension will not change under extreme operating heat. Cyclan metal is not affected by temperatures 50% higher than those at which standard piston ring irons fail. Cyclan possesses extraordinarily high impact value for shock resistance and can undergo considerable distortion without sacrificing resilience.

Cyclan is available for original equipment piston rings in heavy duty engines. Some Sealed Power Cyclan Piston Ring sets are available for replacement now. Others will follow soon.



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CORPORATION
MUSKEGON, MICHIGAN

Let our engineers tell you the Cyclan story!

Sealed Power

**PISTON RINGS · PISTONS
CYLINDER SLEEVES**



**"He
Might
Need
It..."**

"He never was much for letter-writing when he was in college. But he must know how anxious Mother and I are . . . now that he's off in Korea. Haven't heard from him in six weeks. Of course, they say 'no news is good news' . . . but I wonder. Maybe he can't write . . . because . . . maybe he's in a hospital somewhere. And maybe he needs blood. I don't know . . . but

I'm not taking any chances. That's why I'm giving blood."

★ ★ ★

Yes, all kinds of people give blood—for all kinds of reasons. But whatever *your* reason, this you can be sure of: Whether your blood goes to a combat area, a local hospital, or for Civil Defense needs—this priceless, painless gift will some day save an American life!

Give Blood Now
CALL YOUR RED CROSS TODAY!
NATIONAL BLOOD PROGRAM



Business Executives!

✓ Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Blood-mobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed employees of your company's plan of co-operation?
- ☐ Was information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a single pint of blood may mean the difference between life and death for any American . . . the need for blood is *urgent*!



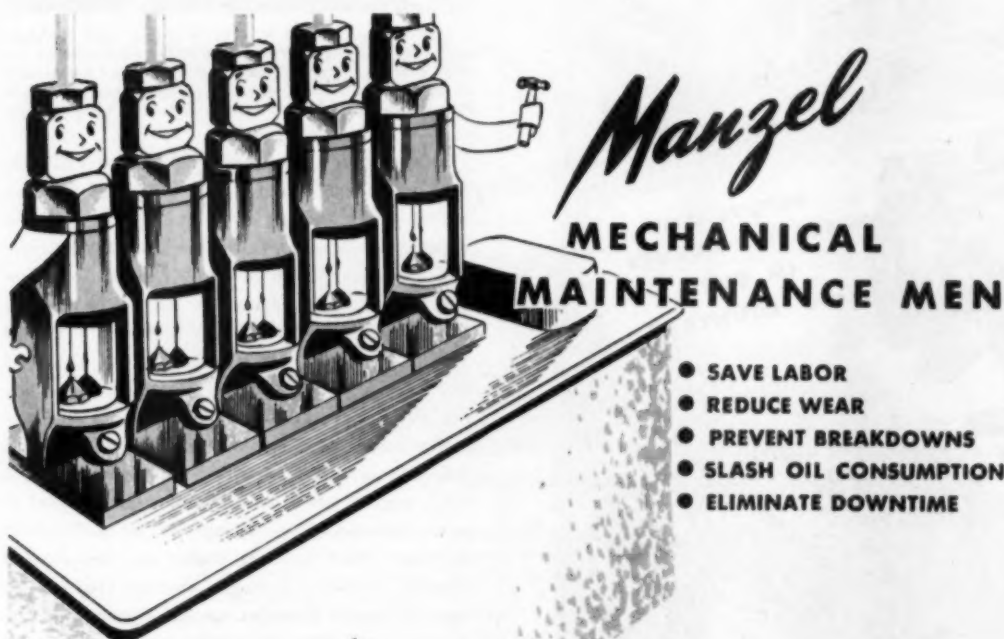
Cummins Hosts Meeting

Chicagoland truck dealers visit Cummins. Thirty-one Autocar, Diamond T, Federal, International Harvester, and White truck dealers and their salesmen visited Cummins Engine Company, Inc., at Columbus, Indiana, recently for a one day JBS-600 conference. The trip was organized by, and the visitors were guests of, R. H. Snyder, president, Cummins Illinois Engine Sales, Inc., Chicago. The truck dealers and their salesmen toured Cummins manufacturing facilities, and in addition were fully briefed on the newest member of the Cummins line, the 150 hp. Model JBS-600 Cummins diesel. The trip to Columbus, and re-

turn, was made in an ACF-Brill, Cummins powered bus, owned and operated by Continental Trailways. The engine in the bus is a 200 hp. Model NHHB-600 (horizontal) Cummins diesel, which, in nine months, logged 196,000 miles without down time, while averaging eight miles per gallon in inter-city bus service.

Diesel Operators' Conference

The University of Nebraska will hold its second Diesel Operators' Conference at the University of Nebraska in Lincoln on October 15, 16 and 17. The program is now in the course of preparation and will be published as soon as it becomes available.



Automatic force feed lubrication by Manzel provides a sure way to *lengthen* the life of machinery and reduce operating costs. Manzel Lubricators unfailingly supply *exactly* the amount of oil needed at each wearing point *and no more*. They are furnished as standard equipment on leading makes of engines and machinery, or they can be installed on your present equipment. Write now for full information.

- SAVE LABOR
- REDUCE WEAR
- PREVENT BREAKDOWNS
- SLASH OIL CONSUMPTION
- ELIMINATE DOWNTIME



275 Babcock Street, Buffalo 15, N. Y.



How much of your engine maintenance bill is due to repair of breakdowns that could have been avoided—if you'd had advance warning?

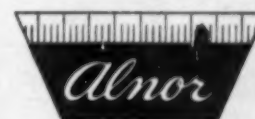
At a fraction of that cost, Alnor Exhaust Pyrometers offer you a constant check of engine performance—advance warning of

Cylinder Overload Preignition
Scaled Jackets Clogged Ports
Detonation Faulty Injection

Get the best from your diesel—minimum fuel consumption per horsepower and long service uninterrupted by foreseeable breakdowns. Get constant protection of your engine, cylinder by cylinder, with an Alnor engineered Exhaust Pyrometer System.

Get Full information—Quickly! Your nearby Alnor Diesel specialist is conveniently listed in the classified directory. Ask him to help you select the Pyrometer and thermocouple assembly designed for your engine. Or send for Bulletin 4361 with complete details of the full Alnor line of Pyrometers.

Every Diesel Deserves Alnor Protection.



Man knows only that which he can measure

ILLINOIS TESTING LABORATORIES, INC.
Room 308, 420 N. La Salle St.,
Chicago 10, Illinois

President of Safety Seal Piston Ring



Weldon Baker

Weldon Baker was elected president of Safety Seal Piston Ring Co., Fort Worth, Texas, at the recent meeting of the firm's board of directors. Safety Seal Piston Ring Co., established in April, 1951 by the late William S. Baker as a partnership with his sons, Weldon and Don Baker, was incorporated in January of 1953 and has purchased new plant facilities which will enable the company to greatly increase production.

Safety Seal Piston Ring Company manufactures a complete line of industrial and marine piston rings, including a new one-piece sealing ring on which patents are pending. The new Safety Seal factory and offices are located at 1111 Foch Street in Fort Worth.

To Serve Industries in Canada

Richard N. Mathews has been elected vice president of Kewanee-Ross of Canada Limited, and placed in charge of the firm's new general offices at 57 Bloor Street West, Toronto. W. Bradford Russell, president, said in an announcement. The recently formed company was established to provide engineering and sales service to Canadian in-

dustry on all types of shell and tube heat exchangers, coolers, surface and barometric condensers, steam jet ejectors, and high pressure steam boilers.

"This move is being made in order to give Canadian customers more adequate engineering assistance and better service on both heat exchangers and high pressure boilers," Mr. Mathews explained. "Ross type exchangers are well known in Canada, having been made for the Canadian market for over twenty years by Horton Steel Works Limited, of Fort Erie, Ontario. The actual equipment will continue to be made by Horton, with engineering by Kewanee-Ross," he added. The new company is a division of American Radiator & Standard Sanitary Corporation and is affiliated with Kewanee-Ross of Kewanee, Illinois and Buffalo, New York.

Pakistan Railway Engineers



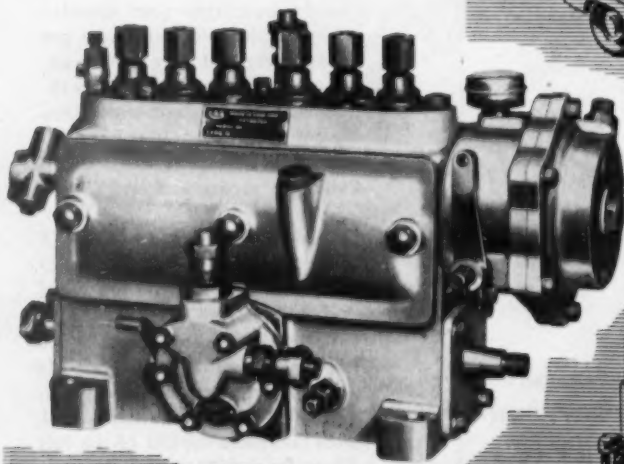
Engineers Mohammed Y. Warris (right) and Mohammed S. Ansari (center) of the Pakistan Railways receive first hand training on Cooper-Bessemer locomotive diesel engines from Fletcher M. Devin, manager Railway Engine Division of Cooper-Bessemer Corporation.

Two top flight engineers of the Railways of Pakistan are currently attending a comprehensive locomotive diesel training and inspection program at The Cooper-Bessemer Corporation's plant in Grove City, Pennsylvania. Sent to this country to assimilate details of American-built railway equipment, Mohammed Y. Warris and Mohammed S. Ansari will spend over a year in studying all phases of this country's railroading techniques. Besides making studies of manufacturing techniques and procedures, these men have the advantage of an actual full scale cutaway of a 6-cylinder supercharged FWL engine, ten of which are being furnished to power General Electric locomotives for the Pakistan Railway. Their training under the direction of Fletcher M. Devin, manager, Railway Engine Division of Cooper-Bessemer, includes complete engineering background on efficient operation and maintenance of locomotive engines which they will eventually supervise.

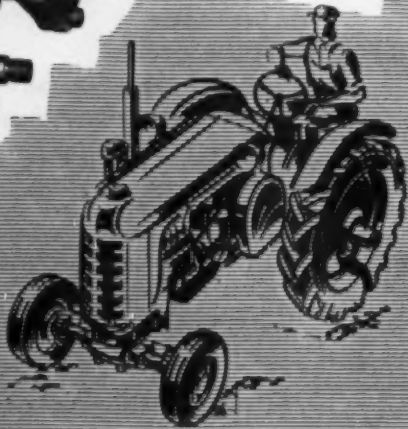
In addition to furnishing diesel power for the ten locomotives on this particular project, Cooper-Bessemer already has its engines on numerous draglines and power shovels, built by Bucyrus-Erie and Marion Power Shovel, currently in operation in Pakistan. During their stay, Mr. Warris and Mr. Ansari will devote further study to engineering developments at Cooper-Bessemer's main plant at Mount Vernon, Ohio.



The world's largest
manufacturers of
**FUEL INJECTION
EQUIPMENT**
for diesel engines



DEPOTS AND
SERVICE AGENTS
IN OVER
100 COUNTRIES



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Fuel Injection and Electrical Equipment

FOR MORE SERVICE YEARS
Atlantic Flexible Metal Hose



- For **VIBRATION DAMPENING**
CORRECTING MISALIGNMENTS
EXPANSION, CONTRACTION
 of Diesel Exhausts, Air, Fuel Lines
- For **VENTILATING HOLDS**
- For **LOADING & UNLOADING**
 Oils, Molten Chemicals, Refrigerants,
 Light or semi-solids

SEAMLESS OR INTERLOCKING CONSTRUCTION
 BRONZE, STEEL, STAINLESS STEEL— $\frac{1}{8}$ "-36" I.D.
 with fittings as needed.

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prevents leakage . . . eliminates glands. Six sizes deliver from 5 to 37.5 gpm at 0 psi. All joints are ground . . . no gaskets.

For further information, write for Pump Catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.

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FRAM FILTERS pay for themselves in **SIX MONTHS!***

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The Barton Mines Corporation works with crystal garnet ore, producing abrasive grains and powders. Three diesel engines in the company's power plant ran in "an exceedingly dusty location," to put it mildly. To combat this condition, Fram lube oil filters were installed. Barton reports these results:

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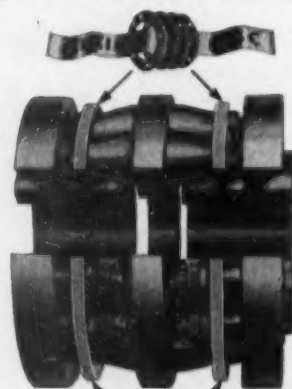
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 OIL • AIR • FUEL • WATER
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Bay Area Diesel News

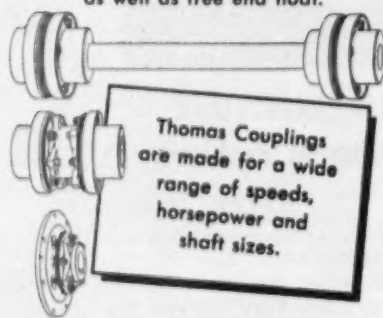
By BRUCE WADMAN

Specify THOMAS ALL METAL FLEXIBLE COUPLINGS for Power Transmission to avoid Costly Shut-Downs

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.



THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT

NO MAINTENANCE PROBLEMS

ALL PARTS ARE SOLIDLY BOLTED TOGETHER

Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

SAN FRANCISCO, May 15: Two large Enterprise diesel generating sets have been purchased for service in the Philippines on a dam construction job. Each Enterprise engine-generator set is skid mounted, with all operating equipment self-contained for immediate field service. One 6 cylinder turbocharged Q engine rated 1270 hp. at 360 rpm. will drive a 900 kw. generator. One 8 cylinder turbocharged G engine rated 925 hp. at 450 rpm. will drive a 650 kw. generator. Overall length of each skid mounted unit is approximately 35 ft. with weight in the range of 60 to 100 tons.

THE Pittsburgh-Des Moines Steel Co. in San Jose has purchased another 60-kw., 480 volt GM generator set to be used primarily for 300-amp. welders. The Delco generator is driven by a GM 6-71 diesel. This is the fourth unit of this type put into service by Pittsburgh-Des Moines Steel Co.

ON OR about June 1, a new Waukesha dealership will be opened in Emeryville. Waukesha Pacific Equipment Co., located at 1310 Sixty-Sixth St. in Emeryville, will integrate industrial and automotive Waukesha diesel sales, parts, and service into one new plant location. This will be the only authorized Waukesha distributor in Northern California.

THE National Supply Company's Engine Division Branch, located in Oakland, received its first Lister stationary diesels on May 6. The 1, 2, and 3 cylinder models are now on display at the Oakland Branch.

DISPLAYED at the Tulsa Oil Show from May 14 to 23 was an Enterprise model DGSM 362, turbocharged, dual-fuel engine rated 400 hp. at 800 rpm. The engine was completely skid mounted and self sufficient, with all equipment and controls mounted on a common skid base, including radiator (engine driven) compressor, speed-up gear and pump for oil field use. The unit was completely automatic and starts or is shut down when pre-determined pump pressure limits are reached. This is believed to be the first completely automatic engine of this type for oil field service.

THE GMC Truck and Coach Div. Branch in Oak-

land has recently finished a successful spring session of their diesel school, and they plan to reopen the school in the fall. One hundred thirty men from GMC dealers, GM truck operators, private garages that specialize in GM diesel work, and men from various oil companies took the spring course of 11 sessions of 2 weeks each. Men came from as far north as Alaska, as far south as Douglas, Arizona, and as far east as Ogden, Utah to attend the school.

FOR powering a new planing mill, Mr. A. Harwood of Laytonville has installed a twin 6-71 GM diesel unit with a total of 330 hp. For driving the head-rig in his new sawmill, Mr. R. D. White of Pescadero has installed a new Series 6-71 GM diesel.

THE tug *Moi*, owned by Young Bros. Div. of Oahu Railway and Land Co. of Honolulu, finished her trial run in Seattle on March 27 and left for Honolulu on April 1. She is a twin screw 143 ft. ocean going tug, with power provided by two 1200 hp. Fairbanks-Morse diesels.

A PAIR of the new inclined 4-71 GM diesels have been purchased from West Coast Engine & Equipment Co. for installation in a 46 ft. Stevens Cruiser for Hank Bauman. These diesels, rated at 94 hp. continuous, are the first of this model to be sold in the Bay Area.

A TURBOCHARGED model DMM-36 Enterprise diesel will be installed in the Tug *Tyee* for Great Western Towing and Salvage Co., Ltd. The tug will operate along the coast of British Columbia, and its principal work will be towing log rafts.

FROM Buda Engine & Equipment Co., Jack Collins of Berkeley has bought a model 6-DAS-844 Buda 280 hp. diesel for installation in a White-Sterling truck used for hauling lumber from Willits, Calif. to the Bay Area.

FOR powering two Hough Payloaders, two 3-71 GM diesels have been purchased by McGuire & Hester, a contractor in the East Bay Area. This is the fourth installation of this type in the Bay Area.



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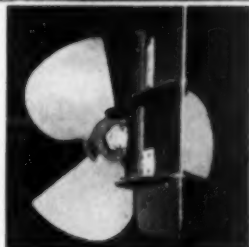
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WIRKKALA PROPELLERS help the 4,100 Hp. WINQUATT buck the wild, untamed Mid-Columbia River between The Dalles and Pasco.



One of the world's most powerful River Tugs, WINQUATT, carries three 59 x 30 WIRKKALA wheels, one showing at right.



"Less vibration, more push, faster reverse in tricky currents and measurable fuel savings," says Captain O. Boyle of Upper Columbia River Towing Co., The Dalles, Ore.

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New 48 Page Guide

Packed with Time-Saving, Money-Saving Kent-Moore Special Service Tools



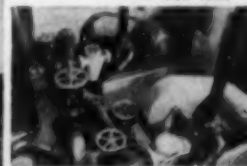
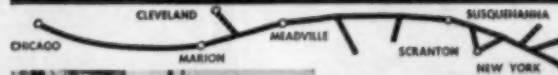
Now available. Kent-Moore's comprehensive new GM Diesel Service Tool Guide. Describes and illustrates more than 300 special tools, developed expressly to meet the essential maintenance requirements of your GM Diesel engine applications. Tools that will save you money, time, and labor. Send for your copy of this Guide today! It's FREE!

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VIKING PUMPS HELP ERIE RAILROAD SERVICE 448 DIESEL LOCOMOTIVES



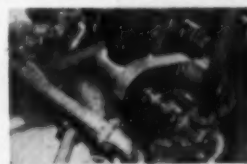
Viking pumps at Susquehanna fueling station

Fueling depots, equipped with units of two Viking heavy-duty, 300 gpm pumps, help the Erie diesel-powered passenger and freight trains maintain their fast schedules. There are three such depots on the main line between New York and Chicago. Included are additional Vikings to pump lubricating oils.

For information on these units ask for bulletin 2501N.



Meadville, Pa., fueling depot uses Viking pumps.



Diesel fuel handled by Viking pumps at Marion, O., depot.



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CHROMATES are the only tried and true answer to controlling cylinder-liner corrosion in diesel engines. Use of chromium inhibitors is universally accepted by locomotive builders.

Sodium chromate stops corrosion before it starts. The presence of this one chemical renders the metal surface passive to corrosive attack. Slight oxidizing action occurring upon initial contact produces an additional safeguard—a protective surface-deposit of iron and chromium oxides.

Diesel locomotives require only 2000 to 2500 ppm sodium chromate at pH 8.5 to 9.5 to minimize the combined

effects of vibration and corrosion. Other units such as standby boilers, stationary and marine diesels, hot water heating systems, and automobile radiators vary in their anti-corrosive requirements from 200 to 5000 ppm sodium chromate. It is important that sufficient chromate concentration be maintained at all times, for to leave valuable equipment unprotected even for short periods may result in serious damage.

Mutual, the world's largest manufacturer of chromium chemicals, supplies the chromates necessary for cooling system protection. Information about corrosion prevention in all types of cooling systems will be sent upon request.

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Maintained All Winter Towing Service



One of the few boats on the Detroit River to attempt all-winter towing service this year was the 65-ft. diesel engined *G. F. Becker*, owned by the Frank Becker Towing Company of Detroit. Towing 1400-ton loads with solid and floating ice to contend with, the craft through January had maintained her regular summer service 100 per cent. Included in her schedule was a semi-weekly trip from Detroit north to Port Huron, Michigan, a distance of 72 miles through the Detroit River, Lake St. Clair and the St. Clair River. Although ice conditions in the Detroit area were light early in the season, the craft had already been maneuvered through some tight squeezes. In preparation for winter operation the craft was repowered last fall with a General Motors 6-110 diesel engine. Added power and the reduction of almost 10,000 pounds in engine weight contributed materially to greater towing efficiency under all conditions.

In open water tests with the new engine her overall speed increased three miles per hour and the time required on a regular 9½ hour run with 200,000 gallons of tar in tow was decreased two hours. More working space in the engine room was also provided by the compactness of the new engine. After serving for many years as the Detroit Marine Post Office delivering mail to Great Lakes freighters, the craft was converted into a tug in 1947. Her beam is 16 ft. and her draft 5 ft. 6 in. She swings a 45 x 32 propeller and is equipped with GM hydraulic reduction and reverse gears of 3 to 1 ratio. The boat is of iron construction and has concrete in her bow to facilitate ice breaking.

Diesel Engine Bulletin

Bulletin #5205 just released by The National Supply Co. Engine Division, Springfield, Ohio, describes the Lister Models FR4 and FR6, 4-cycle, stationary diesel engines. The 4-page folder gives engine dimensions, weights and technical data on these 1000 to 1800 rpm., 36 bhp. to 54 bhp., four and six cylinder units. The FR engines have chrome-hardened cylinder liners, individual fuel-injection pumps for each cylinder, and oversize crankshafts. High and low compression ratios, for easy starting and normal running, respectively, are selected by spring-loaded levers.

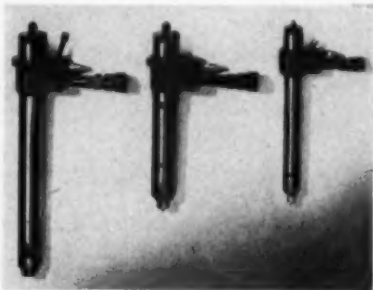
YOUR COPY OF DIESEL ENGINE CATALOG in its eighteenth completely re-edited, revised and expanded edition will be ready to mail June 15. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this latest edition now. Profusely illustrated. \$10.00. Mail checks to DIESEL PROGRESS, 816 North La Cienega Blvd., Los Angeles 46, California.

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The ADECO Model "P" Single-Unit Fuel Injection Pumps are of the "port-control" type. Simple and rugged in construction and precision built by ADECO craftsmen, these pumps are extremely reliable.



ADECO injectors are available in four sizes and a number of different styles and lengths. The ADECO water-cooled injectors are made in size No. 4 only, and have built a reputation for excellent performance where heavy fuel oils are burned.

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Engineers Appointed



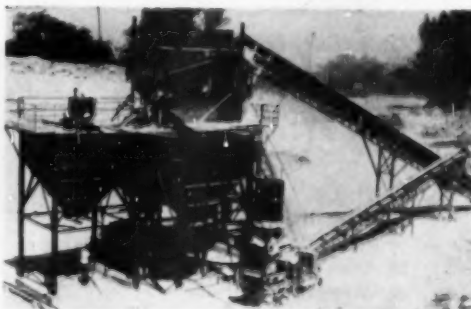
Alexander Ross

H. R. Sennstrom

Schenectady, N. Y.—Appointment of Alexander Ross as chief engineer and H. R. Sennstrom as executive engineer has been announced by H. L. Weinberg, director of engineering, locomotive division, American Locomotive Company. Mr. Ross has been associated with American Locomotive and Montreal Locomotive Works, Limited, Alco's Canadian affiliate, since 1932 when he joined the engineering department at Montreal. In 1940, at the request of the Canadian government, he was temporarily assigned in charge of engineering of the munitions division, Canadian National Railways. In 1941, he returned to MLW and was placed in charge of locomotive engineering, a post he held until 1945. He was transferred to Schenectady as assistant to the director of locomotive engineering in early 1946. He became mechanical engineer chassis design and in October, 1952, was named engineer in charge of locomotive design. He is a member of the Institute of Locomotive Engineering, London; and the American Society of Mechanical Engineers.

Mr. Sennstrom joined American Locomotive Company's engineering department in 1940. He specialized in laboratory and diesel engine development work and in 1946 was named superintendent of the diesel engine laboratory. In 1949 he was appointed research and testing engineer and was in charge of all laboratory work. He directed pioneer work in the use of the spectroscope in analyzing diesel engine lubricating oil in locomotive maintenance. He is a member of the American Society of Mechanical Engineers, Society of Automotive Engineers and American Society of Testing Materials.

Dependable Crusher Power



For six years, two 150 hp. Model HIP-600 Cummins diesels have powered the rock crusher of the Hamilton Stone Company, Fond du Lac, Wisconsin. Production of the crusher is 450-500 yards of saleable material per eight hour day. The photo shows the secondary crusher with the Cummins diesel in the bottom center portion of the picture.

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**GET RID OF DIRTY OIL . . .
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HILCO has 25 years experience in oil purification. Let this experience work for you.

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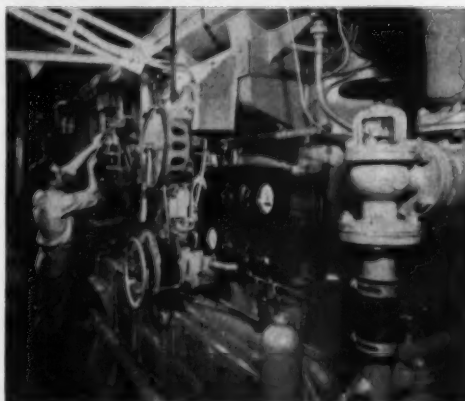
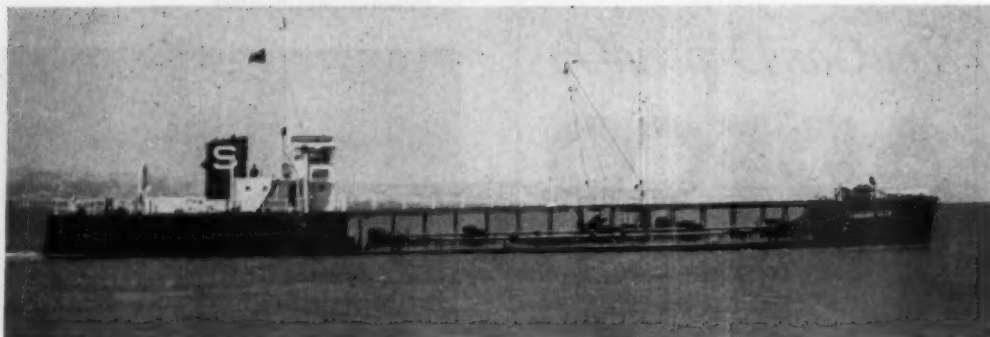
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THE "STANDARD OILER"

By BRUCE WADMAN

SINCE April, 1952, the *Standard Oiler*, a refueling tanker owned by Standard Oil Co. of California, has been a familiar sight around the San Francisco Bay Area piers and docking facilities. This tanker, which made her maiden voyage on April 18, 1952, is used for bunkering black oil directly onto ships and also to scattered shore distributing and customer plants in the Bay Area. At first glance, she looks like an ordinary small tanker, but there is an interesting background to her that bears looking into. In the first place, there is a bit of history connected with this tanker. She was pressed into service to replace the old *Contra Costa*, a tanker which operated in the same capacity in the Bay Area from 1908 to 1951. Way back then, Otto Fisher of Diesel Engine Co. sold two 250 hp. Union gasoline engines to Standard Oil Co. to power the *Contra Costa*. Now in the more modern *Standard Oiler*, a single Union 6 cylinder, 560 hp. diesel engine is utilized to drive the tanker. This 325 rpm. direct-drive, direct-reversible diesel propels the *Standard Oiler*, at a speed of 10 knots loaded in contrast to the *Contra Costa*, which was able to make only 8 knots loaded. This favorable speed



The STANDARD OILER and view of the engine room showing the Union diesel engine.

comparison becomes even more significant when one takes a look at the relative capacities of the two tankers. The *Contra Costa* had a dead-weight of 1,100 tons and a cargo capacity of 7,783 barrels. The *Standard Oiler* has a deadweight of 1,342 tons and a cargo capacity of 9,470 barrels. This tanker not only portrays a history of almost fifty years of dealings between Union Diesel and Standard Oil, but is another outstanding case of the transition to dieselized drive in the marine field. The *Standard Oiler* is a symbol of progress, a progress in which the diesel engine is playing an ever increasingly important role in its application to more and more



YOU ARE SPENDING TOO MUCH *if you're thinking of replacing it!*

... because your cracked or shattered casting can be returned to as-new condition by the GUTH FUSION PROCESS at a fraction of its replacement cost.

WHATEVER THE CONDITION OF YOUR CASTING

Even if you have to sweep up the pieces in a basket, Guth-Pascoe can repair it as good as new and guarantee satisfactory and efficient service.

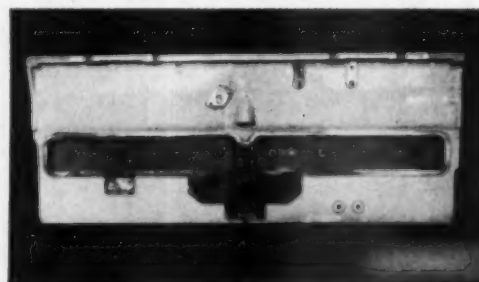
Illustrated is a 1125 DAS Buda Diesel engine block as it was received after "throwing a rod" and as it left our plant after being repaired. There is practically no limit to the size and complexity of castings which can be restored. All ferrous and many non-ferrous metal castings can be repaired the Guth-Pascoe way! It will pay you to investigate Guth-Pascoe when an emergency arises.

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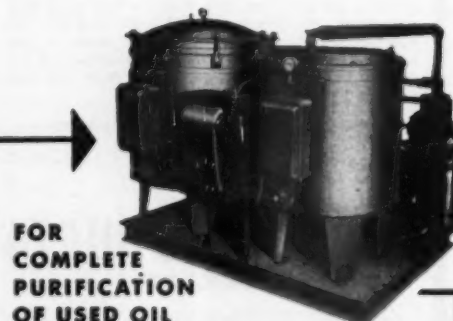
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segments of the field of transportation formerly dominated by steam and gasoline power.

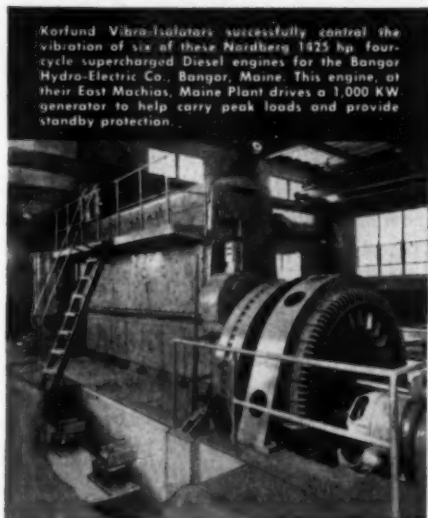
The second interesting feature of the *Standard Oiler* is embodied in its design. This vessel was built originally in 1944 as the YW-94 and was used in the South Pacific in World War II. In October, 1951, she was acquired by Standard Oil Co. and was reconditioned at Bethlehem-Pacific Coast Steel Corp. in San Francisco. The tanker originally measured 174 ft. overall. The unique design feature was the insertion of a 28 ft. 4 in. center section, which lengthened the tanker to 202 ft. 4 in. overall. With the addition of this center section, the *Standard Oiler* has a gross tonnage of 711.62 tons. Her beam measures 32 ft. and her depth is 15 ft. She has a total of eleven cargo compartments. The Union Diesel engine originally in the tanker was overhauled under the supervision of Union's engineers and restored to perfect operating condition. The *Standard Oiler* has been in continuous service since her maiden voyage and plans to feed oil-hungry ships in the San Francisco Bay for a long time to come.

Farris Acquires Pickering Governor Company

Victor W. Farris, president of Farris Engineering Corporation, of Palisades Park, N. J., has announced the acquisition of the Pickering Governor Company, including all patents, inventory and equipment. Production of the governor will be carried on without interruption, in the newly enlarged Farris plant. With this change of ownership, the firm becomes a Farris affiliate and will be known as the Farris Pickering Governor Company. Pickering governors have been produced since 1862. The early models were all mechanical, but today the company produces hydraulic governors as well. Under the Farris management it is planned to expand the line and, through its world-wide organization, to offer improved servicing and availability of replacement parts.

YOUR COPY OF DIESEL ENGINE CATALOG in its eighteenth completely re-edited, revised and expanded edition will be ready to mail June 15. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this latest edition now. Profusely illustrated.

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Korfund Vibration Isolators successfully control the vibration of six of these Nordberg 1425 hp four-cycle supercharged Diesel engines for the Bangor Hydro-Electric Co., Bangor, Maine. This engine, at their East Machias, Maine Plant drives a 1,000 KW generator to help carry peak loads and provide standby protection.

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You can install engines anywhere (even in hospitals, office and apartment buildings, on truck trailers, railroad cars or ships) with positive freedom from objectionable vibration by using Korfund Vibration Control units.

Economical and efficient, Korfund Vibration Control units reduce engine and building maintenance costs; reduce noise level; and frequently eliminate the need for special foundations.

For more information, see our page in the "Diesel Engine Catalog"; or our catalog in Sweet's Files — or write for your copy of our Bulletin No. 6.

Special recommendations on request, without obligation. A half-century of experience is at your disposal. Representatives in principal cities.

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Floyd Bennett Field, New York.....	1	450-hp. Fairbanks-Morse
Prudential Ins. Co., Newark, N. J.....	1	740-hp. Baldwin
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Lone Star Gas Co., Dallas, Texas.....	1	400-hp. Cooper-Bessemer (Gas)

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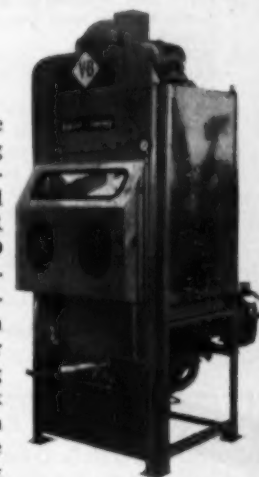
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CUTS
piston cleaning time
from 14 hours to 1 hour



All truck engine parts are now being cleaned in a *fraction* of the usual time with VAPOR BLAST LIQUID HONING. Tremendous time savings at the main terminal and repair shops are helping to increase truck mileage between overhauls for the nation's leading motor freight carriers.

Vapor Blast Model 3030

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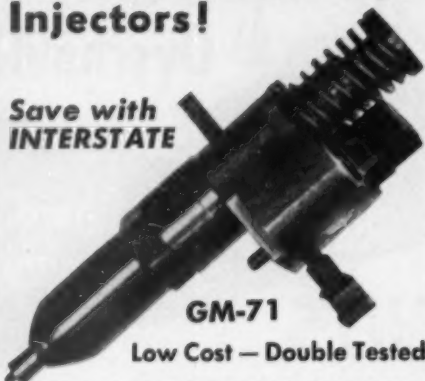
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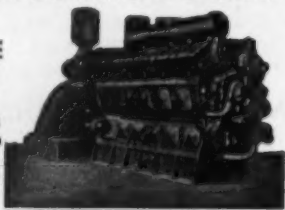
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Army Locomotives



The first locomotives of an order for 83 new Alco-GE diesel-electric locomotives for the Army Transportation Corps were delivered last month, and the order will be completed late this year, according to an announcement by American Locomotive Company and General Electric Company. The new 1600 hp. units are a military road switching type adapted to operation on any standard or wide-gage track in any climate in the world. They are comparable in characteristics, speed and pulling power to the standard four-motor Alco-GE 1600 hp. road switcher, but include several alterations and modifications to meet exacting Army specifications. 1. A mechanical adjustment allows movement of the wheels on the axles so that the locomotives can be operated on standard and wide-gage tracks. 2. The locomotives have built-in characteristics which will permit operation in temperatures ranging from -40 deg. F. to 125 deg. F., with provision for operation in temperatures as low as -65 deg. F. 3. Overall locomotive weight is pared to 120 tons, weight of the standard 1600 hp. road switcher, despite the addition of non-standard equipment. This equipment includes three-motor instead of two-motor trucks, an extra 800-gallon fuel tank and winterization items. 4. Couplers of A. A. R. and Willison transition type can be fitted to the locomotives, and piping and brackets are provided for installation of vacuum brakes. 5. Locomotive width and height are reduced to conform with Army restrictions.

The locomotive is 56½ feet long, 13½ feet high from rail and 9½ feet wide over grab rails. It is powered by a 1600 hp. Alco 12-cylinder supercharged engine which drives a GE generator and traction motors. Geared for a top speed of 65 mph., it is designed for either freight, passenger or switcher service. The locomotive meets the all-important Army requirements of keeping the weight under 120 tons to conform with load limits of foreign countries. Weight of the standard Alco-GE six-motor road switcher is 180 tons. Because of lighter track and weaker roadbeds, the foreign requirements are set at 40,000 pounds per axle weight on drivers, as compared with the 60,000-pounds-or-more limits generally accepted in this country. The weight is distributed evenly over two trucks, each having three axles.

Automotive Sales Manager

Mr. Al Anderson, west coast regional manager of the Buda Engine & Equipment Co., announces the appointment of James T. Shirley as automotive sales manager. Mr. Shirley, known to his many friends as "Jim," is no stranger to the trucking industry. For the past seven years he has been with the Bank of America (Vernon Branch) where he spent the entire time serving the financial needs of the industry. Mr. Anderson assures those who have had the opportunity of dealing with Mr. Shirley in financial matters that there will be no change in his ever present desire to be of service. To most of the motor transportation fraternity this move will mean a new role for an old friend. To others who haven't known him he says "Meet a man who understands your problems and has a genuine desire to help solve them."

President of SAE



Robert Cass

Robert Cass, assistant to the president of The White Motor Company, Cleveland, well known in the truck industry, has been installed as 1953 president of the Society of Automotive Engineers at the recent annual meeting of the group. Mr. Cass immediately began a coast-to-coast tour

which will take him to every section of the country's largest automotive engineering society. He succeeds D. P. Barnard, of Standard Oil Co. of Indiana. During the past 18 months, Mr. Cass served as director of the motor vehicle section of the Federal government's National Production Administration.

"The automotive and aircraft industries today face two very real shortages," he stated in his acceptance talk at the annual dinner of the society. "The shortage of trained engineers continues to warrant real concern and our training facilities must be expanded to fill this need. The other shortage is a continued shortage of strategic materials. The shortages of critical elements due to our nation's preparedness program present real problems and a great challenge to the automotive and aviation engineers. Substitutes today will be called upon to do even more work, handle more heat and live longer than the materials they replace.

"The responsibility of the engineer has been clearly defined to keep America's great transportation industry constantly on the alert and constantly moving forward. Material conservation and new uses for metals will lead us to better transportation and more efficient production techniques in the years ahead," he concluded.

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- An accessory section describing engine and plant accessories.
- A transmission section describing torque converters, etc.
- A classified buyers' guide giving valuable information as to the source of many items you buy in the diesel industry.
- The advertising section which further details the manufacturer's product.

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Improvements and changes are normal to a healthy, growing industry. Unless your information source brings you up-to-date on all these changes and improvements, you are not receiving the maximum benefits due you. Volume 18 of DIESEL ENGINE CATALOG performs this service. It is new. It is complete. It is as modern as the latest engine improvement. Every major engine manufacturer is represented between its two covers. It answers your need for complete, concise and easy to read information.

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Fill out and mail the coupon below and DIESEL ENGINE CATALOG, Volume 18 will come to you postage pre-paid. Any other old reference book is obsolete. The cost is but \$10.00.

Gulf Coast Diesel News

By Michael T. Pate

HUROC Company, 1109 Scanlan Bldg., Houston, have ordered a Stewart & Stevenson Model RD 15 D.C. generating set to power a magnet crane. A G.M. series 71, 2-cylinder 34 hp. diesel will power the unit, the installation being made by Stewart & Stevenson Services, Inc., Houston.

W. R. SIMS Company, of Morgan City, Louisiana, has purchased two G.M. Series 51, Model 43200 diesels to power a 33-foot steel crew boat being built by E. W. & A. P. Dupont Company, of Morgan City.

BELLEW & Bellew, Abilene, Texas, have purchased through Stewart & Stevenson Services, Inc., Houston, two G.M. Model 62420, Series 110 diesels, developing 150 hp. at 1200 rpm. The diesels are to be used as drives for two Redhead deepwell Stewart & Stevenson turbine pumps for irrigation purposes.

STANOLIND Oil & Gas Company, Houston, has purchased a G.M. Model 12103 diesel, developing 260 hp. at 1600 rpm., together with torque converter, to be used to power a drilling rig mud pump.

SOCONY-Vacuum Oil Company, Inc., has had installed by Todd Shipbuilding Company, Houston, two Superior diesel engines, each developing 1080 shaft hp. at 360 rpm. as propelling power on a 24,000-bbl. tanker being outfitted for inland lakes and coastal service. The tanker will be 300 feet in length, and will carry a crew of 19.

NESTOR Kitten, Slaton, Texas, has purchased from Stewart & Stevenson, Houston, a General Motors series 51, 4-cylinder diesel to power a turbine pump for irrigation service.

PURE Oil Company, Houston, has bought through Stewart & Stevenson Services, Inc., a series 71, Model 6031C General Motors diesel to drive a Hunt Model 50 coring reel for a deep well drilling rig. The diesel will develop 130 hp. at 1600 rpm. The Company has also secured a G.M. series 71, model 2031C to drive a 4x5 Mission water pump on the same rig.

MUSTANG Tractor & Equipment Co., Houston, has installed for Gribble Marine Service, Houston, two Caterpillar marine units, Model D-337, each developing 170 hp. at 1600 rpm., to be used to drive twin screws through 2:1 reduction gear in the converted houseboat *Heavymoon*. The craft is 90 feet long, with 18-foot beam and 5-foot draft. She will be used in offshore exploration work.

HOUSTON Oil Field Material Company has purchased from Stewart & Stevenson one model 8103 General Motors diesel which it is installing to drive a mud pump for Standard Sulphur Company, Rosenberg, Texas.

JOE HOLMES, Edinburg, Texas, has purchased a series 71, model 6031C General Motors diesel to drive a deepwell turbine pump. The diesel will develop 130 hp. at 1600 rpm.

DIESEL PROGRESS 816 No. La Cienega Blvd., Los Angeles 46, California

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West Coast Diesel News

By Fred M. Burt

PURCHASED by L. C. Cameron, a Southern California oil well drilling contractor, for power on a drilling rig in use at Chino Hills District operation, a 6-cyl. 150-hp. General Motors diesel.

SOLD BY Hallett Mfg. Co., Inglewood, Calif. to Shelley Tractor & Equip. Co., Miami, Florida, five 2-cyl. 18-hp., water-cooled Hallett diesels to power refrigeration units in shrimp boats.

AT MONTEREY, Oscar Vienola has re-powered his fishing boat *Ann Marie* with a new 3-cyl. General Motors diesel; installation by Phil Hover, Hover Equipment Co.

REFRIGERATION equipment installed at Wilber's Boat Yard, Long Beach, Calif., in Louie Jacobsen's *Glacier Bay* (from Pelican, Alaska) has a new Petter diesel to drive the Freon system.

TWO 54-B Bucyrus-Erie shovels from Crook Co., Los Angeles, powered with 275-hp., super-charged Cummins diesel engines, purchased by Kaiser Steel Co., in Fontana, to be used for general crane work

TO SUPPLEMENT 5280-hp. in similar Clark equipment, Sun Ray Oil Co. has installed a 2000-hp. natural gas engine driven compressor at its Rancho San Francisco station near Newhall, Calif.

DELIVERED to Army Transportation Corps by Anderson-O'Brien Co., Los Angeles, ten 30-kw. sets (3-cyl. 45-hp. GM diesels, Delco generators) to be used aboard various ships for dc. auxiliary power.

USED BY Inet, Inc., Los Angeles, electrical equipment manufacturers, a 200-hp. Cummins diesel to power two special 30-kw. dc. low voltage generators used in jet engine starting equipment.

THE EX-NAVY LCS Eshamy re-powered with two 6-cyl. 230-hp. General Motors propulsion diesels (Model 6-110) will be used by owner, Copper River Co-op. Inc., as freighter, towboat, and part of company's floating cannery during fishing season at Cordova, Alaska.

OTHER BOATS re-powered with GM 6-110's, 230-hp. diesels: *Daisy*, 70 ft. dragger owned by Martin Suich, Seattle; *Laurie Ann*, owned by ARB Packing Co., of Seattle and Wrangell, Alaska, also with new 3.7:1 GM reverse gear; and 70 ft. dragger *Theresa S.*, owner Matt Sarunich, Seattle, with 3/7:1 reverse and reduction gear.

TO Paul Anderson Logging Co., to replace a pair of 200-hp. gasoline engines, driving through torque converters, in a Washington yarder, a 230-hp. GM diesel with GM torque converter and Western Torqmaster.

NEW MODEL 4-51 GM diesel engines sold to West Coast Cedar Products Co., Humtulpis, Wash., to power shake mill; to Alvin Taylor, Centralia, for portable saw mill power; to Phil Cope to replace 140-hp. gasoline engine in his 40-ft. salmon trawler.

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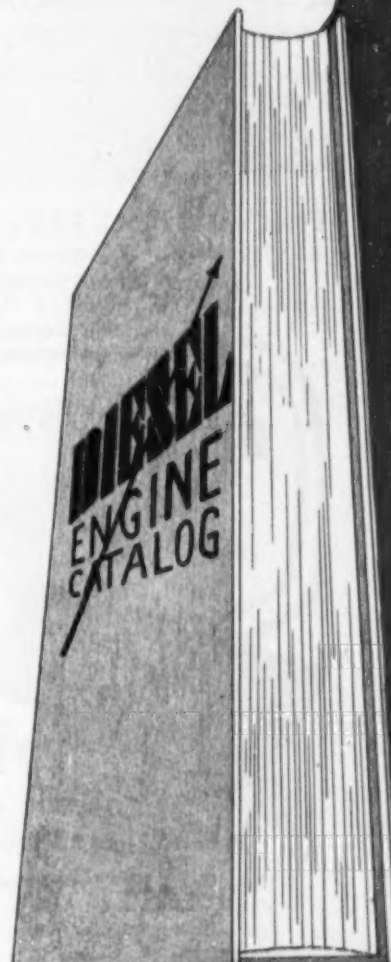
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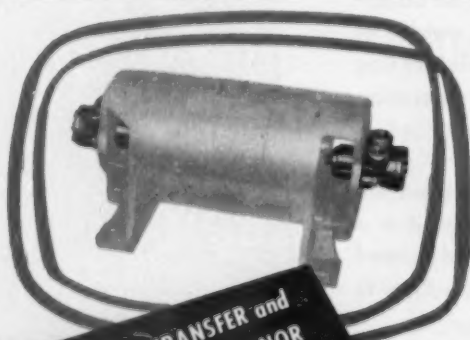
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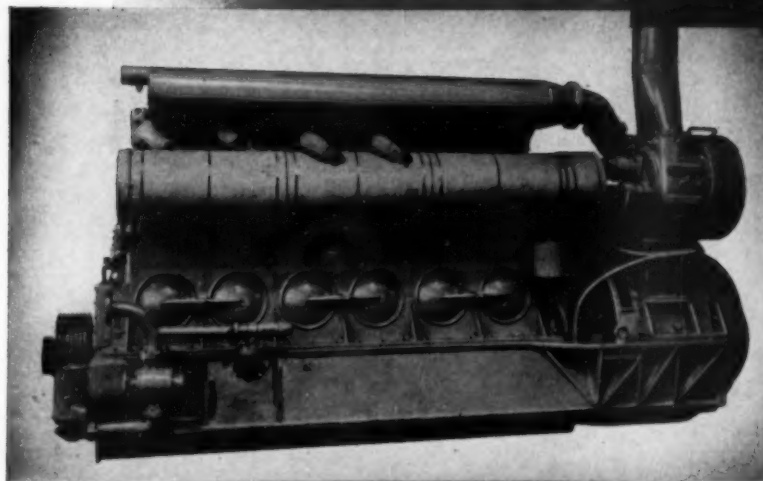
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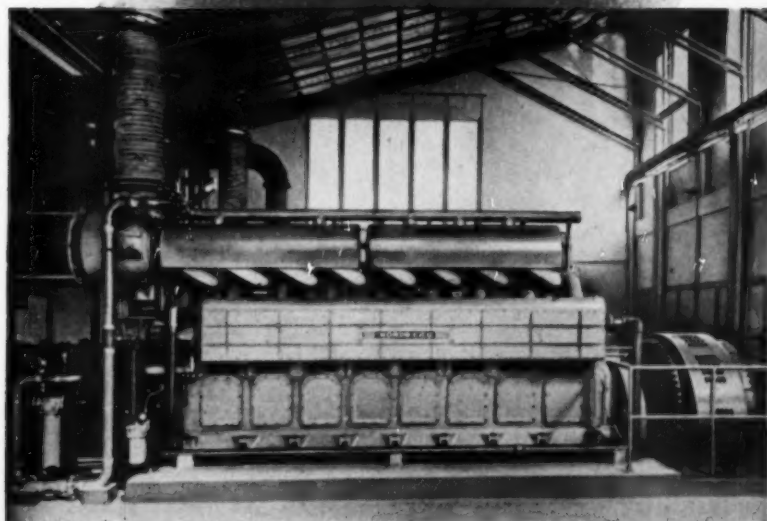
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Above, Elliott turbocharger on a 1200-hp Baldwin engine for locomotive service. Below, the turbocharger is seen at the left on an installation of a 2100-hp, 6 cylinder Nordberg engine.



HOW DESIGNED in two types, for high as well as low pressure, the new Elliott line of turbochargers profits by Elliott engineers' experience of the past ten years in the design and manufacture of these units. The new high-pressure design can deliver blower pressures up to 20 psi, permitting 170 bmep in the cylinder. The new line is built in sizes for engines up to 3500 hp. Units can be supplied for a variety of mounting and piping arrangements, and various assembly positions of turbine inlet and blower discharge.

Elliott-built turbochargers are now operating on engines, the combined output of which exceeds 6,000,000 bhp. They are accepted and utilized by every builder of slow-speed, heavy-duty four-cycle Diesels, 250 hp and up, in the United States, and provide these manifest advantages:

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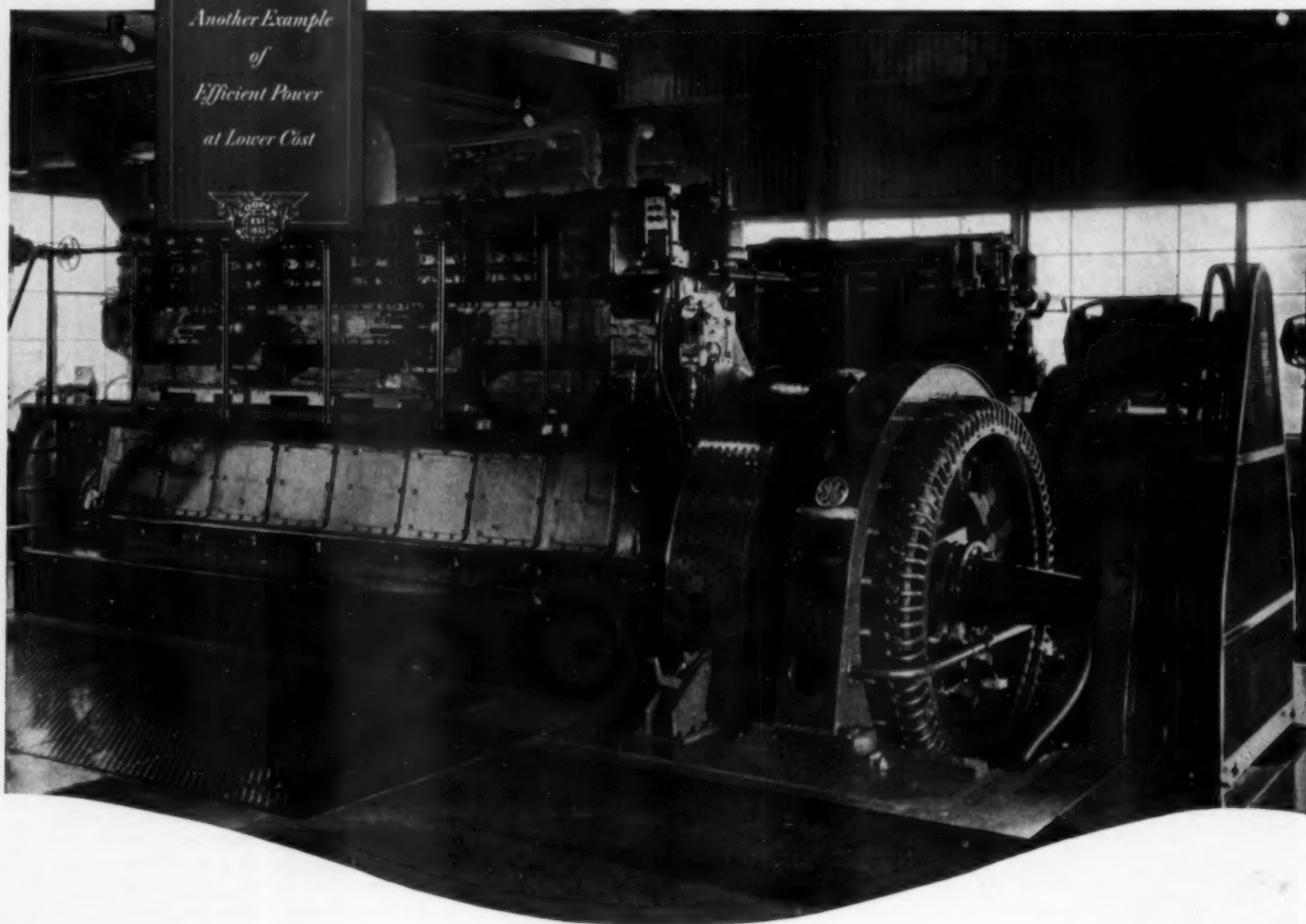
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of
Efficient Power
at Lower Cost*



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SHOWN here are some of the latest Cooper-Bessemer gas engine generating units installed in Texas-Illinois Natural Gas Pipeline Company's new pipeline. Modern JS's like these have now gone into five Texas-Illinois stations; will likewise power 4 more new stations as the year goes on. Texas to Illinois experience with Cooper-Bessemer power dates back to 1929 when Cooper-Bessemer were first installed on the old Texoma and Natural Gas Pipeline Company of America lines. Like the modern JS's, these old engines were noted for dependability, low maintenance and high efficiency...and they're still running!

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